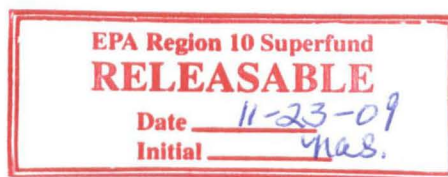


Brix Maritime Company Response to EPA's 104(e) Information Request

Entire response Releasable



**STATE OF OREGON
DIVISION OF STATE LANDS
SUBMERGED AND SUBMERSIBLE LAND LEASE
COMMERCIAL AND INDUSTRIAL**

ML-9230
APP#16639

The Oregon State Land Board and the Division of State Lands (STATE) hereby lease to the person(s) herein named (LESSEE), the following described lands on the terms and conditions stated herein, to wit:

NAME of LESSEE:
Brix Maritime dba Foss Maritime

ADDRESS:
PO Box 83018
Portland OR 97283

Legal classification of LESSEE is an "Oregon corporation",

Land situated in Multnomah County more fully described as follows:

All state-owned submerged lands in the Willamette River in Section 11, Township 1 North, Range 1 West, Willamette Meridian, Multnomah County, Oregon, more particularly described as follows:

Commencing at a point on the intersection of the Southwest line of Tax Lot 39 (Multnomah County Assessor's Map Number 2120) and the line of Ordinary High Water on the left bank of the Willamette River;

thence riverward along a line perpendicular to the thread of the stream to the line of Ordinary Low Water and the TRUE POINT OF BEGINNING;

thence continuing riverward along said perpendicular line a distance of 175 feet;

thence upstream and 175 feet parallel to said line of Ordinary Low Water a distance of 510 feet, more or less, to a point which lies 175 feet riverward from the line of Ordinary Low Water as extended perpendicular to the thread of the stream from a point which is the intersection of the Northeast line of Tax Lot 39 (Multnomah County Assessor's Map Number 2120) and the line of Ordinary High Water;

thence shoreward along said perpendicular line a distance of 175 feet to the line of Ordinary Low Water;

thence downstream along said line of Ordinary Low Water a distance of 510 feet, more or less, to the TRUE POINT OF BEGINNING, containing 2.0489 acres, more or less and as shown on attached Exhibit "A".

Total number of acres: 2.0489 acres more or less.

Hereinafter referred to as "leasehold".

SECTION 1 - LEASE TERM AND RENEWAL

- 1.1 Term: This Lease shall continue for a period of 15 years commencing on May 1, 2000 the month and date of which shall be known as the LEASE ANNIVERSARY DATE, and expiring on April 30, 2015, the month and date of which shall be known as the LEASE EXPIRATION DATE.
- 1.2 Renewal: LESSEE shall have an option to renew this Lease for an additional period of 15 years after the original and each renewal lease term provided that LESSEE has submitted a completed lease renewal application form to the STATE not less than one hundred and eighty (180) days prior to LEASE EXPIRATION DATE. Upon receipt of such application, this Lease shall be renewed by the STATE unless:
- 1.2.1 The STATE determines, in its sole discretion, that the LESSEE has not complied with the terms of this Lease, any applicable statutes, rules, ordinances, or permits, or any orders or directives of appropriate governmental agencies now in effect or subsequently issued or enacted; or
 - 1.2.2 The LESSEE is no longer the preference right holder as defined by applicable state law, or
 - 1.2.3 The STATE determines that the renewal of this Lease for all or portions of the leasehold would be contrary to local, state, or federal law, or would be inconsistent with the policies set forth in OAR 141-082-0010.
- 1.3 STATE shall provide LESSEE two (2) years advance written notice of its intent to not renew this Lease for all or portions of the leasehold pursuant to the provisions of this Section. In the event that the STATE determines not to renew this Lease, but less than two (2) years remain in the Lease term, the STATE shall utilize the holdover provisions (Section 7.11) of this Lease to complete the two (2) year notice period and to allow the LESSEE sufficient time to vacate the authorized area and to relocate any sublessees in an orderly fashion.

SECTION 2 - AUTHORIZED USES

- 2.1 Purpose: This Lease shall grant the LESSEE the right to use the above described land for the specific purpose(s) described below in accordance with these LEASE TERMS and CONDITIONS, applicable local (including local comprehensive land use planning and zoning ordinances), state and federal laws and the applicable Oregon Administrative Rules.

Marine Industrial/Marine Services and Non-Marine Uses
(Berthing of barges, machine shop on barges, moorage of tug and workboats)

SECTION 3 - ANNUAL LEASE RENTAL PAYMENT CALCULATION AND ADJUSTMENTS

- 3.1 Annual Lease Rental Payment: The Lease rental payment to be paid by LESSEE to STATE shall be \$ [REDACTED] for the first year of the Lease as provided in Section 3.1.1 based on the Riparian Land Value as shown below. Receipt of the first year's Lease rental payment is hereby acknowledged.

3.1.1 The initial annual Lease rent payment shall be calculated as follows:

	Use Class	Area (square ft.)	Rate Choice	Annual Rent
a)	Marine Industrial Marine Services	84,002 square feet	Riparian Land Value	
b)	Non-Marine Uses	5,248 square feet	Riparian Land Value	
TOTAL				

- 3.2 Annual Lease Rental Payment Adjustment: The annual lease rental payment shall be adjusted annually in accordance with the provisions of the Oregon Administrative Rule in effect at the time. The second year's rent shall be \$ [REDACTED]. The third year's rent shall be \$ [REDACTED]. Each payment shall be due on the Lease Anniversary Date as shown in Section 1.1.

SECTION 4 - MODIFICATION OF LEASEHOLD AREA OR USE

- 4.1 Modification of Leasehold Area or Use: LESSEE may request that the STATE expand or reduce the size, or change the use of the leasehold using a form provided by the STATE. However, no such change shall occur unless authorized in writing by the STATE.
- 4.1.1 The STATE may amend this Lease to reduce the leasehold area as requested if the portion of the leasehold is not in use, or does not contain any leasable structures. Structures and improvements within the vacated leasehold area shall be treated as in Section 9.3. If the modification results in a reduction of rental(s) due hereunder, such reduction shall become effective commencing on the first (1st) full year after the later of: (1) the date of the change of area or use, or (2) the date of the issuance of the STATE's written approval.
- 4.1.2 Requests to change an authorized use, or increase the leasehold shall be processed and reviewed in the same manner as a new lease application.

SECTION 5 - RESERVATIONS AND RESTRICTIONS

- 5.1 Compliance: The STATE shall have access to the leasehold at all reasonable times for the purpose of evaluating and ensuring compliance with the terms and conditions of this Lease. The State shall have the right to examine pertinent records of LESSEE for the purpose of ensuring compliance with the Lease.
- 5.2 Reservations: The STATE reserves:
- 5.2.1 The right to lease and dispose of all coal, oil, gas, geothermal resources and other minerals, and all deposits of clay, stone, gravel and sand valuable for building, mining, or commercial purposes together with the right to explore, mine, develop, produce and remove such minerals and other deposits with the right of ingress and egress thereto, and to terminate this Lease as to all or any portion of the leasehold when required for these purposes with one hundred twenty (120) days prior written notice to LESSEE or as otherwise provided in law.
 - 5.2.2 The right to enter in and upon the leasehold at any time for purposes of inspection or management.
 - 5.2.3 The right at any time to grant easements across the premises for tunnels, telephone and fiber optic cable lines, pipelines, power lines, or other lawful purpose, with right of ingress and egress thereto. The STATE shall include in any such grant of easement a requirement that the easement holder take all reasonable precautions to ensure that exercise of their easement rights does not unreasonably interfere with LESSEE's use(s) authorized in the Lease.
 - 5.2.4 All rights not expressly granted to LESSEE are reserved by the STATE.
- 5.3 Public Access and Recreational Use Reservation: All state-owned submerged and submersible land shall remain available and open to the public for commerce, navigation, fishing and recreation unless restricted or closed by the STATE to public entry pursuant to the provisions of applicable Oregon Administrative Rules. LESSEE may request the STATE to close the leasehold to public entry or restrict recreational use by the public on all or portions of the leasehold to protect persons or property from harm arising from or in connection with the LESSEE's activities.

This reservation shall not grant the public any right to use or occupy LESSEE-owned property or structures authorized under this lease without LESSEE's permission.

5.4 Restriction on Use: In connection with use of the leasehold, the LESSEE shall:

- 5.4.1 Comply with all applicable local, state and federal laws, regulations, ordinances, and permits, and with all orders and directives of appropriate governmental agencies now in effect or subsequently issued or enacted, including local comprehensive land use planning and zoning ordinances, and correct at LESSEE own expense any failure of compliance created through the LESSEE fault or by reason of any operation or activities conducted or allowed by LESSEE;
- 5.4.2 Dispose of all waste in a proper manner and not allow debris, garbage or other refuse to accumulate within the leasehold. If LESSEE allows debris, garbage or other refuse to accumulate within the leasehold, the STATE shall have the right to remove the debris, garbage and other refuse, and collect the cost of such removal from LESSEE;
- 5.4.3 Not cut, destroy or remove, or permit to be cut, destroyed or removed, any vegetation that may be upon the leasehold except with written permission of the STATE. The LESSEE shall promptly report to the STATE the cutting or removal of vegetation by other persons;
- 5.4.4 Conduct all operations within the leasehold in a manner which conserves fish and wildlife habitat, protects water quality, and does not contribute to soil erosion or growth of noxious weeds;
- 5.4.5 Maintain all buildings, docks, pilings, floats, gangways, similar structures, and other improvements located within the leasehold in a good state of repair; and
- 5.4.6 Not unreasonably interfere with the public's trust rights of commerce, navigation, fishing or recreation.

5.5 Waste Water Disposal: In addition to any other applicable laws and regulations, LESSEE shall comply with Oregon Department of Environmental Quality and Oregon State Marine Board requirements for sewage collection and disposal for on-water boat and floating structures.

5.6 Hazardous Materials: LESSEE shall not use, store, or dispose of, or allow the use, storage, or disposal of any material that may pose a threat to human health or the environment, including without limitation, hazardous substances, pesticides, herbicides, or petroleum products except in strict compliance with applicable laws, regulations and manufacturer's instructions and shall take all necessary precautions to protect human health and the environment, and to prevent discharge or release of any hazardous substance or material to the environment from the leasehold. LESSEE shall keep and maintain accurate and complete records of the amount of such substances and materials stored and used on the leasehold, and shall immediately notify STATE of any release or

threatened release of such substances to the environment from the leasehold or otherwise attributable to operations or activities on the leasehold. LESSEE shall not dispose of or allow the disposal of waste products or hazardous substances or materials on the leasehold. The STATE shall have the right to remove and remediate any release of hazardous substances on the leasehold or attributable to operations or activities conducted or allowed by LESSEE on the leasehold and to collect the cost of such removal or remediation from LESSEE.

SECTION 6 - REQUIREMENTS

- 6.1 Assignment and Sublease: Except as noted in Section 6.2, the LESSEE may not assign or sublease nor enter into any third party agreement without first obtaining the prior written consent of the STATE pursuant to the requirements of the applicable Oregon Administrative Rules. Requests must be received by the STATE, in writing at least thirty (30) calendar days prior to the effective date of sublease or assignment. The STATE shall make a good faith effort to complete its review of such applications within thirty (30) days. If the application is incomplete, or if the STATE requests additional information concerning the proposed assignment or sublease, the time period for reviewing applications shall be extended. The STATE reserves the right to condition its consent as it deems reasonably prudent, including the right to require changes to the terms of this Lease. Each assignee, sublessee, and third party interest shall be required to comply with all of LESSEE's obligations under this Lease, and the applicable Oregon Administrative Rules. LESSEE shall remain liable for the performance of the obligations under this Lease unless the STATE's written consent expressly releases LESSEE from further liability hereunder. For the purposes of this section, if LESSEE is a corporation or partnership, the transfer of any corporate stock or partnership interest (including by operation of law) shall be deemed an assignment subject to the provisions of this Section if the result of said transfer shall be the change of management control or controlling interest of LESSEE.

- 6.1.1 LESSEE may not grant a mortgage or security interest in this Lease without prior written consent of the STATE which shall not be unreasonably withheld. Any subsequent assignment by the creditor or civil recovery shall require the prior written approval of the STATE.

- 6.2 Permitted Assignments and Subleases: Notwithstanding the provisions of Section 6.1 of this Lease, the following assignments, mortgages and security interests, and subleases of the LESSEE's interest in the Leased Premises shall be allowed without further STATE approval:

- 6.2.1 Subleases of portions of the LESSEE's interest in the leasehold area, in the ordinary course of LESSEE's business for the purposes approved under this Lease as specified in Section 2.1.
- 6.2.2 Subleases of the entire leasehold for a term that is less than one year for the purpose specified in Section 2.1.
- 6.2.3 The transfer or ownership of the Lease caused by the death of the LESSEE shall be considered an assignment requiring the STATE's approval. However, a transfer of ownership to a spouse or

immediate family member is an assignment that does not require the STATE's prior approval.

- 6.3 Condition of Premises and Improvements: The leasehold area has been inspected and is accepted in its present condition, and LESSEE takes the leasehold and improvements, if any, AS IS. The STATE has made no oral representations concerning the condition of the leasehold, nor its fitness or suitability for any purpose.
- 6.4 Liability: LESSEE agrees to defend, indemnify and hold STATE harmless from and against all claims, demands, actions, suits, judgments, losses, damages, penalties, fines, costs, and expenses (including expert witness fees and costs and attorneys fees in an administrative proceeding, at trial, or on appeal) arising from or attributable, in whole or in part, to the Lease or any operations conducted or allowed by LESSEE on the leasehold. As used herein, "State" means the State of Oregon and its commissions, agencies, officers, employees, contractors, and agents.
- 6.5 Assessments: LESSEE shall pay all taxes and/or assessments that may be legally charged on public lands or related improvements which are levied against the property subject to this Lease, whether or not such taxes and/or assessments have been levied against the leasehold or STATE by the assessing agency.
- 6.6 Bond: The STATE reserves the right to require the LESSEE to furnish to the STATE a surety bond or an equivalent cash deposit or certificate of deposit which names the State of Oregon as co-owner to ensure that the LESSEE will perform in accordance with all terms and conditions of the Lease.

SECTION 7 - MISCELLANEOUS

- 7.1 No Partnership: The STATE is not a partner nor in a joint venture with LESSEE in connection with the business carried on under this Lease and shall have no obligation with respect to LESSEE's debts or other liabilities.
- 7.2 Non-Waiver: Waiver by either party of strict performance or any provisions of this Lease shall not be a waiver nor prejudice the party's right to require strict performance of the same provision in the future or of any other provision.
- 7.3 Binding Interest: This Lease shall be binding upon and inure to the benefit of the parties, and the respective heirs, administrators, successors, and assigns of the parties hereto.
- 7.4 Notices: Any official STATE notice required under this Lease shall be sent by certified mail and shall expressly be deemed to be delivered after the certified letter is mailed to the address given by the LESSEE in the signature block of this Lease or as shown on the most recent written notice of record with this Lease. LESSEE shall provide the STATE with a written notice of any change of address, change in corporation/partnership/ownership, or change in person(s) authorized to represent the LESSEE. The STATE shall provide written acknowledgment of

such LESSEE written notices and retain copies of both the LESSEE notice(s) and STATE acknowledgment(s) with this Lease. LESSEE's failure to receive such written acknowledgment within thirty (30) days of the date LESSEE sent the original notice shall be constructive notice to LESSEE that: (1) the STATE has not properly received the notice, and (2) that such attempted notice shall be of no force and effect until such time as the notice is actually received and acknowledged by STATE.

7.5 Liens: In the event liens or other charges are placed on the leasehold premises, including land or improvements, arising out of LESSEE's actions directly or indirectly, the LESSEE shall immediately cause such liens to be discharged. The STATE may terminate this Lease if LESSEE fails to discharge such liens or charges or provide the STATE with a sufficient bond covering the full amount of the lien after ten (10) days notice to do so by the STATE. LESSEE shall pay and indemnify the STATE for all costs, damages or charges of whatsoever nature, including attorney's fees, necessary to discharge such liens or charges whether such costs, damages or charges are incurred prior or subsequent to any termination of this Lease.

7.6 Default: The following shall be events of default:

7.6.1 Failure of the LESSEE to pay any rent, tax, reimbursement or other charge or payment due hereunder within twenty (20) days of the date such payment is due. For the purposes of this subsection, if the due date for such payment is not otherwise stated in this Lease or otherwise defined in statute or administrative rule, such payment shall be due on the date set forth in the notice from the STATE to the LESSEE informing the LESSEE of its obligation to pay such charge or payment.

7.6.2 Failure of LESSEE to comply with applicable laws, Oregon Administrative Rules or any non-payment related terms or conditions or obligations of the Lease within thirty (30) days after written notice by the STATE specifying the nature of the deficiency. Upon timely request from the LESSEE, the STATE may in its good faith discretion permit the deadline for curing such non-compliance to be extended if it finds that: (1) the default cannot reasonably be cured within the thirty (30) day period, (2) the interests of the STATE will not be harmed by an extension, (3) such default was not due to the willful acts or gross negligence of the LESSEE, and (4) the STATE and the LESSEE are able to mutually agree upon a written plan and timeline for remediation.

7.6.3 Insolvency of LESSEE; the filing by LESSEE of a voluntary petition in bankruptcy; an adjudication that LESSEE is bankrupt or the appointment of a receiver of the properties of LESSEE; the filing of any involuntary petition of bankruptcy and failure of LESSEE to secure a dismissal of the petition within thirty (30) days after filing; attachment of or the levying of execution on the leasehold interest and failure of LESSEE to secure discharge of the attachment or

release of the levy of execution within ten (10) days. If LESSEE consists of two (2) or more individuals or business entities, the events of default specified in this paragraph shall apply to each individual unless within ten (10) days after an event of default occurs the remaining individuals produce evidence satisfactory to STATE that they have unconditionally acquired the interest of the one causing the default. If the Lease has been assigned in compliance with Section 6.1 of this Lease, the events of default so specified in this subsection shall apply only with respect to the one then exercising the rights of LESSEE under the Lease.

7.6.4 Notwithstanding the above, if the STATE in good faith believes that a material default has occurred which may imperil the STATE's rights in the land or its fiduciary duties under law, the STATE may declare an immediate default without any right of LESSEE to cure the deficiency.

7.7 Termination Upon Default: In the event of a default by LESSEE, the STATE shall have the right to terminate this Lease if it has given LESSEE notice of the default and of the STATE's intent to terminate this Lease if the default is not completely cured by the deadline contained in the notice and if the listed default has not been cured by the stated deadline. The deadline contained in the notice must be at least twenty (20) calendar days from the date the notice is sent by certified mail, or if earlier, the date LESSEE actually receives said notice. The STATE shall be entitled to recover from LESSEE all costs arising out of the re-entry and all costs of re-letting the premises. The STATE shall be entitled to recover the amount of unpaid rent required to be paid under the Lease from the date of default until a new Lease has been, or with the exercise of reasonable efforts could have been, secured, if the STATE was determined to re-let the leasehold. All improvements located thereon shall be disposed of as provided by Section 9.3 of this Lease. If the LESSEE owns a floating home and has placed such home on the property pursuant to the provisions of Section 2.1 of this Lease, the lease termination provisions of ORS 90.630 shall apply to the extent that they are inconsistent with the provisions of this Lease.

7.8 STATE's Right to Cure Defaults:

7.8.1 If the LESSEE fails to perform any obligation under this Lease, the STATE shall have the option to perform the obligation of the Lease after thirty (30) days written notice to the LESSEE. All of the STATE's expenditures to carry out the obligation shall be reimbursed by the LESSEE on demand with interest at the rate of one percent (1%) per month accrued from the date of expenditure by the STATE.

7.8.2 In the event any violation or breach of the provision of this Lease is causing damage to the leasehold or the LESSEE is utilizing the leasehold in a manner not permitted by the provision of this Lease, or in any case damages are occurring to the leasehold or the environment as a result of activities conducted on the leasehold,

the STATE may immediately enter upon the leasehold and take such action as necessary to cease such damages or use. In the event the damage or use is occurring by reason of a violation or breach of the provisions of this Lease, the LESSEE shall be liable for all costs incurred by the STATE by reasons of such violations. The STATE, at its option, may send notice to the LESSEE of such violations and LESSEE shall immediately cease such use or violation and correct such violation.

- 7.9 Termination Upon Mutual Consent: This Lease may also be terminated by mutual written consent of LESSEE and STATE.
- 7.10 Weed Control: The LESSEE shall control noxious weeds including aquatic weeds, plant pests and diseases within the leasehold as directed by the local county weed control district, the Oregon Department of Agriculture and/or any other governmental authority which may now or in the future have authority with regard to the prevention and/or control of noxious weeds, plant pests and/or diseases, or as may be authorized or directed by the STATE.
- 7.11 Holdover: If LESSEE does not vacate the leasehold at the time required at expiration or upon termination of a Lease, STATE shall have the option to treat LESSEE as a tenant from month to month, subject to all of the provisions of this Lease except the provisions for term, renewal, and rental. The STATE shall have the option to unilaterally establish a new rental for the month-to-month tenancy, with said rental payable in advance. If a month-to-month tenancy results from holdover by LESSEE under this paragraph, the tenancy shall be terminable at the end of any monthly rental period upon written notice from STATE given not less than thirty (30) days prior to the termination date which shall be specified in the notice.
- 7.12 Governing Law: This Lease shall be construed, interpreted and governed by and subject to the laws of the State of Oregon and the administrative rules of the Division of State Lands and the State Land Board, as they may change from time to time. The Oregon Administrative Rules contain terms and conditions which relate to the rights and responsibilities of the parties hereunder, and such terms and conditions (as they may change from time to time) are hereby incorporated by reference and made a part of this Lease.
- 7.13 Binding on Successors: This Lease shall be binding on and shall inure to the benefit of the successors and assigns of the parties hereto, but nothing in this section shall be construed as a consent by STATE to any disposition or transfer of the Lease or any interest herein by LESSEE except as otherwise expressly provided in this Lease.
- 7.14 Nondiscrimination: The leasehold shall be used in a manner, and for such purposes, that assure fair and nondiscriminatory treatment of all persons without respect to race, creed, color, religion, handicap, disability, age, gender, or national origin.

- 7.15 Right To Sue More Than Once: STATE may sue periodically to recover damages for the period corresponding to the remainder of the lease term and no action for damages shall bar later actions for damages subsequently accruing.
- 7.16 Remedies Cumulative: The remedies contained in this Lease shall be in addition to, and shall not exclude any other remedy available at law or in equity, and exercise by either party of any one or more of such remedies shall not preclude the exercise by it at the same or different times of any other such remedies for the same default or breach by the other party.
- 7.17 Attorney Fees: If suit or action is instituted in connection with any controversy arising out of or in connection with this Lease, the prevailing party shall be entitled to recover all costs and disbursements incurred, including such sum as the court may adjudge reasonable as attorney fees at trial and on any appeal of the suit or action, and in any bankruptcy case or proceedings.
- 7.18 Exhibits: All Exhibits to which reference is made in this Lease are incorporated in this Lease by the respective references to them, whether or not they are actually attached. References to "this Lease" include matters incorporated by reference.
- 7.19 Compliance With Applicable Law: The STATE's performance under this Contract is conditioned on the LESSEE's compliance with the provisions of ORS 279.312, 279.314, 279.316, 279.320 and 279.555, which are incorporated by reference herein.
- 7.20 Late Charges and Interest: It is understood by both parties that late payments by the LESSEE of rent and other charges due hereunder will cause the STATE to incur costs not contemplated by this Lease, the exact amount of which will be difficult to ascertain, including costs associated with administrative processing and accounting. As such, the parties agree that, notwithstanding other remedies permitted hereunder, if the LESSEE has not made full payment of amounts due within twenty (20) days of the date such payment is due, LESSEE shall pay an additional charge equal to five percent (5%) of the amount of the late rent or other charge. In addition, all amounts due and owing under this agreement, including late charges, shall bear interest at the lower of: (1) the highest interest rate allowable by law, or (2) twelve percent (12%) per year.

SECTION 8 - INSURANCE

- 8.1 Commercial General Liability: LESSEE shall obtain at LESSEE's expense, and keep in effect during the term of this Lease, comprehensive or commercial general liability insurance covering bodily injury and property damage with an insurance company acceptable to the STATE. This insurance shall include personal injury coverage, contractual liability coverage for the indemnity provided under this Lease and products/completed operations liability. Combined single limit per occurrence shall not be less than \$1,000,000, or the equivalent. Each annual aggregate limit shall not be less than \$1,000,000, when applicable.

8.2 Revisions/Amendments/New Requirements: The amounts and types of insurance (including those specified in Section 8) and the party responsible for procuring the insurance shall be established and reviewed when circumstances warrant. The requirements may be revised or amended by the STATE periodically at the STATE's sole discretion after STATE:

- (a) consults with its insurance advisor;
- (b) consults with LESSEE;
- (c) considers the commercial reasonableness of any requirements, amendments or revisions; and
- (d) considers the STATE's need for adequate insurance protection and the STATE's fiduciary obligations.

Within thirty (30) days notice to LESSEE of the STATE'S revision or amendment of the insurance requirements, LESSEE shall provide the STATE with satisfactory evidence that the LESSEE has obtained new insurance coverage which conforms with the revised/amended insurance requirements. If mutually agreed in writing, LESSEE may have additional time to obtain such insurance.

8.3 Named Insured Parties: The liability insurance coverages required for performance of the Lease shall include the State of Oregon, the Division of State Lands and their sections, officers and employees as additional insured.

8.4 Certificate(s) of Insurance: As evidence of the insurance coverages required by this Lease, the LESSEE shall furnish certificate(s) of insurance to the STATE prior to the issuance of this Lease, and not less often than annually thereafter and as reasonably requested by STATE. The certificate(s) will specify all of the parties who are additional insured (or loss payees). Insurance coverages required under this Lease shall be obtained from acceptable insurance companies or entities. The LESSEE shall be financially responsible for all deductibles, self-insured retentions and/or self-insurance included hereunder.

SECTION 9 - IMPROVEMENTS

9.1 Authorized Improvements or Structures: No improvement that exceeds fifteen thousand dollars (\$15,000) in cost or value may be constructed or placed upon the leasehold unless the LESSEE shall have first obtained the prior written authorization of the STATE. Approval for improvements consistent with the purposes of this Lease shall not be unreasonably withheld or delayed. All improvements must be consistent with the authorized use(s) of this Lease as stated in Section 2.1 and in compliance with all applicable laws, regulations, and ordinances as stated in Section 5.4.1.

9.2 Unauthorized Improvements or Structures: Unauthorized improvements shall, at the election of the STATE, either be removed from the leasehold by LESSEE (or if STATE so elects, by the STATE at LESSEE's cost and expense), or remain within the leasehold.

9.3 Removal of Structures and Improvements: Any LESSEE-owned structure or improvement must be removed within ninety (90) days of the termination of the

SECTION 10 - ADDITIONAL CONDITIONS AND STIPULATIONS

SECTION 11 - ENTIRE AGREEMENT

[illegible]

The LESSEE expressly agrees to all covenants herein and binds him/herself for the payment of the rental herein before specified.

DIVISION OF STATE LANDS

Stephen Johnson
Authorized Signature

March 28, 2001
Date

Division of State Lands
775 Summer ST NE, STE 100
Salem, OR 97301-1279

Note: If the LESSEE is a corporation,
the signer warrants that s/he has the
authority to sign the lease on behalf of
the corporation by resolution of its
Board of Directors, or through
delegation of authority to the signer.

LESSEE

Harry G. Johnson / Regional Director
Signature/Title

(Note requirement below)

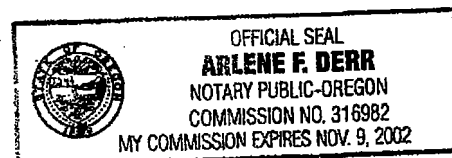
3/23/01
Date

P.O. Box 83018
Portland, OR 97283
Mailing Address

STATE OF)
County of Multnomah)ss

The foregoing instrument was acknowledged before me this 23rd day of
March, 2001, by Harry G. Johnson (officer or agent of corporation),
the Regional Director (title of officer or agent) of Beix Machine dba Loss Martine
corporation, a Delaware (state or place of incorporation) corporation,
on behalf of corporation.

Arlene F. Derr
Signature
My commission expires 11/9/2002



CERTIFICATE OF COMPLIANCE WITH OREGON TAX LAWS

I, the undersigned, hereby swear or affirm under penalty of perjury that to the best of my knowledge, I am not in violation of any Oregon Tax Laws.

For the purposes of this certificate, "Oregon Tax Laws" means those programs listed in ORS 305.380(4) which is incorporated herein by this reference. Examples include the state inheritance tax, personal income tax, withholding tax, corporation income and excise taxes, amusement device tax, timber taxes, cigarette tax, other tobacco tax, 9-1-1 emergency communications tax, the elderly rental assistance program and local taxes administered by the Department of Revenue (Lane Transit District Self-Employment Tax, Lane Transit District Employer Payroll Tax, Tri-County Metropolitan Transit District of Oregon ("Tri-Met") Employer Payroll Tax, and Tri-Met Self-Employment Tax).

Signature: Larry G. Johnson

Date: 3.23.01

Printed Name: Larry G. Johnson

Title: REGIONAL DIRECTOR

J:\Attachment\Awest\ML Waterway Leases Comm and Ind\ML-9230.doc



Oregon

Theodore Kulongoski, Governor

Department of Environmental Quality

Headquarters
811 SW Sixth Avenue
Portland, OR 97204-1390
(503) 229-5696
FAX (503) 229-6124
TTY (503) 229-6993

January 14, 2005

DEQ:IQ:HW:S547

LINDA BROWN
FOSS MARITIME CO
9030 NW SAINT HELENS RD
PORTLAND, OR 97231

Re: 2004 Hazardous Waste Annual Verification

Dear Hazardous Waste Coordinator:

You are receiving this letter because our records indicate that your company has an active RCRA Site Identification Number. Oregon Administrative Rule 340-102-0012 requires facilities with identification numbers to update site information annually. Your facility last notified DEQ that your generator status was Conditionally Exempt Generator (CEG).

If your generator category has not changed from the CEG category for calendar year 2004 and your site information is the same, then you do not need to submit a report. This is a new process for the 2004 verification and applies only for Conditionally Exempt Generators that are not remediation sites. CEGs that are generators due to remediation of environmental cleanup must continue to report every year until the cleanup is completed and the site identification number is withdrawn.

To be sure that nothing has changed, do the following:

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- Review your last reported Site Identification (SI) Form and determine if you need to update any site contact information to DEQ.
- Verify that the site location listed at the end of this letter is still accurate. The RCRA Site ID Number is not transferable to other physical locations.

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If your generator category has changed in calendar year 2004 or you want to update the site contact information, please do one of the following by **May 1, 2005**:

- Access the on-line annual reporting system called HazWaste.net using the information provided at the end of this letter and the attached General Instructions.
- Use hardcopy paper forms. The attached Frequently Asked Question document tells you how to obtain the paper forms.

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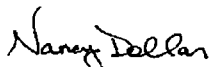
RCRA Site ID Number:	ORD103014866
Personal Identification Number (PIN)	1121
Facility Name:	Foss Maritime Co
Site Location:	9030 NW ST HELENS RD, PORTLAND
User Name for Data Administrator:	Frankw

The following information is included in this packet to help you with the reporting process:

- Frequently Asked Questions Related to Annual Verification for Conditionally Exempt Generators.
- General instructions for using HazWaste.net

Thank you in advance for timely notification of changes to your facility information. If you have any questions regarding this letter, please call the Annual Report Hotline in Portland at (503) 229-6938 or toll-free with the State or Oregon at 1-800-452-4011, extension 6938. You can also e-mail your questions to hazwaste@deq.state.or.us.

Sincerely,



Nancy Dollar, Project Coordinator
Hazardous Waste Program
Land Quality Division





Oregon

Theodore Kulongoski, Governor

Department of Environmental Quality

Headquarters
811 SW Sixth Avenue
Portland, OR 97204-1390
(503) 229-5696
FAX (503) 229-6124
TTY (503) 229-6993

January 14, 2005

DEQ:IQ:HW:S547
LINDA BROWN
FOSS MARITIME CO
9030 NW SAINT HELENS RD
PORTLAND, OR 97231

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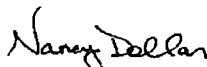
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Sincerely,



Nancy Dollar, Project Coordinator
Hazardous Waste Program
Land Quality Division





Oregon

Theodore Kulongoski, Governor

Department of Environmental Quality

Headquarters

811 SW Sixth Avenue
Portland, OR 97204-1390
(503) 229-5696
FAX (503) 229-6124
TTY (503) 229-6993

January 27, 2006

LQ-HW-AR-CEG
LINDA BROWN
FOSS MARITIME CO
9030 NW SAINT HELENS RD
PORTLAND, OR 97231

Re: 2005 Hazardous Waste Annual Verification

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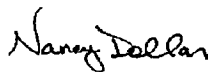
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Personal Identification Number (PIN) 1121
Facility Name: Foss Maritime Co
Site Location: 9030 NW ST HELENS RD
PORTLAND, OR 97231
User Name for Data Administrator: Frankw

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Sincerely,



Nancy Dollar, Project Coordinator
Hazardous Waste Program
Land Quality Division





Oregon

Theodore Kulongoski, Governor

Department of Environmental Quality

Headquarters

811 SW Sixth Avenue

Portland, OR 97204-1390

(503) 229-5696

FAX (503) 229-6124

TTY (503) 229-6993

RECEIVED

JAN 29 2006

F.H.W.

January 25, 2007

LQ-HW-AR-CEG 974
LINDA BROWN
FOSS MARITIME CO
9030 NW SAINT HELENS RD
PORTLAND, OR 97231

Re: 2006 Annual Hazardous Waste Report

Dear Hazardous Waste Coordinator:

You are receiving this letter because our records show that your company has an active RCRA Site Identification Number for a Conditionally Exempt Generator (CEG) status. As a registered CEG, you do not need to complete an annual report unless one of the following situations applies to your business:

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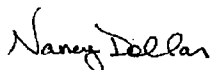
RCRA Site ID Number: ORD103014866

Facility Name: FOSS MARITIME CO
Site Location: 9030 NW ST HELENS RD
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Data Administrator : FRANK WILLIAMSON
User Name: FRANKW

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Hazardous Waste Program
Land Quality Division



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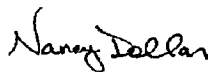
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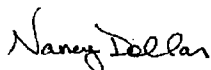
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Nancy Dollar, Project Coordinator
Hazardous Waste Program
Land Quality Division



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 10
1200 Sixth Avenue
Seattle, WA 98101

RECEIVED
OCT 19 2007
GARVEY SCHUBERT BARER

October 17, 2007

Reply to
Attn Of: ORC-158

General Notice Letter Recipient
Portland Harbor Superfund Site, Portland, Oregon

Re: Portland Harbor Superfund Site Potentially Responsible Parties Meeting;
Allocation Process and Convening Discussion

Dear Sir/Madam:

We are writing to you because you or your company received a general notice letter regarding potential responsibility for response costs being incurred and that will be incurred in the future related to the Portland Harbor Superfund Site. EPA is inviting you and your legal counsel to attend a meeting in Portland to discuss the current status of the remedial investigation and feasibility study and how that relates to the timing and scope of future negotiations for cleanup. We also wish to discuss how you can be better prepared for future negotiations. EPA has seen at other multi-party sites how a comprehensive allocation process leads to successful negotiations of complex sediment cleanups. We would like to discuss our experiences with the group.

EPA believes that an effective allocation is important to the success of future settlement discussions and wants to support your efforts to convene a PRP Group and prepare. EPA has a number of different resources it can provide to help you convene an allocation process. Specifically, the EPA Conflict Prevention & Resolution Center in Washington, D.C. will provide a confidential convening neutral to assist your efforts. David Batson, EPA's Senior ADR Specialist, will be available to meet with you and other parties after the meeting to confidentially discuss options for convening an allocation process and potential EPA support.

The meeting will be held on November 7, 2007 at the Edith Green-Wendell Wyatt Federal Building located at 1220 S.W. 3rd Avenue, Portland, Oregon, and will begin at 9 a.m. in Room G-70 (on the ground floor). The general discussion is scheduled to last no more than two hours and then after a short break, all government staff will leave and Mr.

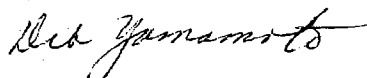
Batson will be available to discuss future activities of the private parties. The room has been reserved for the entire day to ensure that you can continue your meeting until the group decides to end it or break for lunch and reconvene. Any discussions facilitated by Mr. Batson are confidential pursuant to federal law and will not be disclosed to me or any other member of EPA without your permission.

This is a primarily legal or process meeting and it is not being arranged to discuss technical details about the remedial investigation or the data collected to date. If anyone has questions about the studies being undertaken you can call either Chip Humphrey at (503) 326-2678 or Eric Blischke at (503) 326-4006, the Co-lead Remedial Project Managers for the Portland Harbor Superfund Site.

Lori Houck Cora, Assistant Regional Counsel, and Kristine Koch, PRP Search Remedial Project Manager, will be EPA Region 10's representatives at the meeting. You can contact Lori with questions about the meeting at (206) 553-1115, or email her at cora.lori@epa.gov.

We hope you or another company representative can attend this meeting.

Sincerely,



Deb Yamamoto, Manager
Site Cleanup Unit 2
Office of Environmental Cleanup

cc:

Lori Houck Cora, ORC
Kristine Koch, ECL
Chip Humphrey, ECL
Eric Blischke, ECL
Company Legal Counsel, if known

NATIONAL RESPONSE CENTER 1-800-424-8802

*** For Public Use ***

Information released to a third party shall comply with any applicable federal and/or state Freedom of Information and Privacy Laws

Incident Report # 642772

INCIDENT DESCRIPTION

*Report taken at 12:48 on 21-APR-03

Incident Type: FIXED

Incident Cause: EQUIPMENT FAILURE

Affected Area: MULTNOMAH RIVER

The incident occurred on 21-APR-03 at 09:30 local time.

Affected Medium: WATER MULTNOMAH RIVER > COLUMBIA RIVER

SUSPECTED RESPONSIBLE PARTY

Organization: FOSS MARITIME
PORTLAND, OR 97267

Type of Organization: PRIVATE ENTERPRISE

INCIDENT LOCATION

9030 NW ST HELENS ROAD County: MULTNOMAH
City: PORTLAND State: OR

RELEASED MATERIAL(S)

CHRIS Code: OHY Official Material Name: HYDRAULIC OIL

Also Known As:

Qty Released: 0 UNKNOWN AMOUNT Qty in Water: 0 UNKNOWN AMOUNT

CHRIS Code: OTD Official Material Name: OIL, FUEL: NO. 2-D

Also Known As:

Qty Released: 0 UNKNOWN AMOUNT Qty in Water: 0 UNKNOWN AMOUNT

DESCRIPTION OF INCIDENT

CALLER IS REPORTING MATERIAL RELEASED FROM A PUMP IN A SHAFT ALLEY DUE TO EQUIPMENT FAILURE.

INCIDENT DETAILS

Package: N/A
Building ID:
Type of Fixed Object: OTHER
Power Generating Facility: NO
Generating Capacity:
Type of Fuel:
NPDES:
NPDES Compliance: UNKNOWN

---SHEEN INFORMATION---

Sheen Color: RAINBOW
Sheen Odor Description:
Sheen Travel Direction: S
Sheen Size Length: 100 FEET
Sheen Size Width: 30 FEET

---WATER INFORMATION---

Body of Water: MULTNOMAH RIVER
Tributary of: COLUMBIA RIVER
Nearest River Mile Marker:
Water Supply Contaminated: NO

DAMAGES

Fire Involved: NO Fire Extinguished: UNKNOWN

INJURIES: NO Hospitalized: Empl/Crew: Passenger:

FATALITIES: NO Empl/Crew: Passenger: Occupant:

EVACUATIONS: NO Who Evacuated: Radius/Area:

Damages: NO

Closure Type	Description of Closure	Length of Closure	Direction of Closure
--------------	------------------------	-------------------	----------------------

Air: N

Road: N

Waterway: N

Track: N

Major
Artery: N

Passengers Transferred: UNKNOWN

Environmental Impact: UNKNOWN

Media Interest: NONE Community Impact due to Material: NO

REMEDIAL ACTIONS

BOOMS APPLIED, ABSORBENTS APPLIED, MATERIAL CONTAINED, CLEAN UP UNDERWAY

Release Secured: YES

Release Rate:

Estimated Release Duration: 5 MINUTE

WEATHER

Weather: CLEAR, 50°F

Wave Condition: 0 CALM

ADDITIONAL AGENCIES NOTIFIED

Federal: USCG

State/Local:

State/Local On Scene:

State Agency Number: NO REPORT #

NOTIFICATIONS BY NRC

ATSDR OR ATTN: THEODORA TSONGAS (PRIMARY)

21-APR-03 12:53

ATSDR WA ATTN: LINDA GUNNELLS (PRIMARY)

21-APR-03 12:53

NOAA 1ST CLASS BB RPTS FOR OR (PRIMARY)

21-APR-03 12:53

MSO PORTLAND, OR (PRIMARY)

21-APR-03 12:53

OREGON EMERGENCY MANAGEMENT (PRIMARY)

21-APR-03 12:53

WA STATE EMERGENCY MANAGEMENT (PRIMARY)

21-APR-03 12:53

ADDITIONAL INFORMATION

CALLER HAD NO ADDITIONAL INFORMATION.

*** END INCIDENT REPORT # 642772 ***

NATIONAL RESPONSE CENTER 1-800-424-8802

*** For Public Use ***

Information released to a third party shall comply with any applicable federal and/or state Freedom of Information and Privacy Laws

Incident Report # 734577

INCIDENT DESCRIPTION

*Report taken at 12:00 on 09-SEP-04

Incident Type: VESSEL

Incident Cause: OPERATOR ERROR

Affected Area: WILLAMETTE RIVER

The incident occurred on 09-SEP-04 at 08:45 local time.

Affected Medium: WATER WILLAMETTE RIVER

SUSPECTED RESPONSIBLE PARTY

Organization: FOSS MARITIME
PORTLAND, OR 97267

Type of Organization: PRIVATE ENTERPRISE

INCIDENT LOCATION

9030 NW ST HELENS ROAD County: MULTNOMAH

City: PORTLAND State: OR Zip: 97267

RELEASED MATERIAL(S)

CHRIS Code: OLB Official Material Name: OIL, MISC: LUBRICATING

Also Known As:

Qty Released: 2 GALLON(S) Qty in Water: 2 GALLON(S)

DESCRIPTION OF INCIDENT

THE CALLER STATED THAT TWO GALLONS OF LUBE OIL WENT INTO THE WATER AFTER THE STORAGE TANK WAS OVERFILLED. THE STORAGE TANK IS ON A VESSEL.

INCIDENT DETAILS

Platform Rig Name:

Platform Letter:

Location Area ID:

Location Block ID:

OCSG Number:

OOSP Number:

State Lease Number:

Pier Dock Number:

Berth Slip Number:

---SHEEN INFORMATION---

Sheen Color: RAINBOW

Sheen Odor Description:

Sheen Travel Direction:

Sheen Size Length: 75 FEET

Sheen Size Width: 2 FEET

---WATER INFORMATION---

Body of Water: WILLAMETTE RIVER

Tributary of: COLUMBIA RIVER

Nearest River Mile Marker: 5.1

Water Supply Contaminated: NO

---VESSEL INFORMATION---

Name: CAP EVANS Number: 557882 Aground: NO

Flag: UNITED STATES OF AMERICA

Length: 75 Breadth: 25 Draught: 8

Type: TUG

Hull Construction: STEEL HULL

Fuel Capacity:

Fuel on Board:

Cargo Capacity:

Cargo on Board:

DAMAGES

Fire Involved: NO Fire Extinguished: UNKNOWN
INJURIES: NO Hospitalized: Empl/Crew: Passenger:
FATALITIES: NO Empl/Crew: Passenger: Occupant:
EVACUATIONS: NO Who Evacuated: Radius/Area:
Damages: NO

Closure Type	Description of Closure	Length of Closure	Direction of Closure
Air:	N		
Road:	N		Major Artery: N
Waterway:	N		
Track:	N		

Passengers Transferred: UNKNOWN
Environmental Impact: UNKNOWN
Media Interest: NONE Community Impact due to Material: NO

REMEDIAL ACTIONS

CONTAINMENT BOOMS AND ABSORBENT PADS USED
Release Secured: YES
Release Rate:
Estimated Release Duration:

WEATHER

Weather: OVERCAST, 65°F

ADDITIONAL AGENCIES NOTIFIED

Federal: MSO PORTLAND
State/Local:
State/Local On Scene:
State Agency Number:

NOTIFICATIONS BY NRC

ATSDR OR ATTN: THEODORA TSONGAS (PRIMARY)
09-SEP-04 12:05
ATSDR WA ATTN: WAYNE CLIFFORD (PRIMARY)
09-SEP-04 12:05
CG INVESTIGATIVE SERVICE HQ (PRIMARY)
09-SEP-04 12:05
FEMA REGION 10 (PRIMARY)
09-SEP-04 12:05
NOAA 1ST CLASS BB RETS FOR OR (PRIMARY)
09-SEP-04 12:05
MSO PORTLAND, OR (PRIMARY)
09-SEP-04 12:09
OREGON EMERGENCY MANAGEMENT (PRIMARY)
09-SEP-04 12:05
WA STATE EMERGENCY MANAGEMENT (PRIMARY)
09-SEP-04 12:05

ADDITIONAL INFORMATION

THE CALLER HAD NO ADDITIONAL INFORMATION

*** END INCIDENT REPORT # 734577 ***



**PORTLAND HARBOR RI/FS
PROGRAMMATIC WORK PLAN**

**APPENDIX E:
CHEMICAL SOURCES AND
SPILL RECORDS**

April 23, 2004

Prepared for:
The Lower Willamette Group

Prepared by:
Integral Consulting, Inc.

Table E-1. Facilities in Portland Harbor, Chemicals of Interest and Potential Pathways. (Information compiled from DEQ ECSI database, DEQ strategy recommendations, and site-specific reports).

Facility Name	ECSI #	Address	RM	Type of Industry	Chemicals of Interest (present in upland media or identified by DEQ)	Potential Pathway (current or historic) ¹				
						Stormwater	Wastewater Discharge	Groundwater	Spills/Disposal	Product Handling/Transfer
ACF Industries	794	12160 NW St. Helens Rd.	4.0	Current vacant. Former lumber mill, railcar painting and repair, wood crate and pallet fabrication.	PCBs, chlorinated solvents, PAHs, TPH, antimony, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, silver, selenium, thallium and zinc	X	X	X		
Alder Creek Lumber Co., Inc.	2446	14456 NW Gilliam Loop Rd.	3.0	Lumber	wood waste/debris	X		no data		
Anderson Brothers Property	970	5275 NW St. Helens Road	8.0	Current use unconfirmed. Former trucking company hauling agricultural products, freight, and bulk oil and gas.	DEQ reported that materials associated with property include petroleum products, solvents (toluene, mineral spirits), and paint wastes			no data		
ARCO Bulk Terminal	1520	9930 NW St. Helens Rd, Burlington	5.2	Petroleum product storage and transfer	PAHs, BTEX, isopropylbenzene, n-propylbenzene, arsenic, cadmium, chromium, copper, lead, mercury, nickel, zinc	X		X	X	X
ATOFINA Chemicals (formerly Penwalt Chemical, Elf Aloderm)	398	6400 NW Front Ave.	7.5	Former chemical and pesticide manufacture	DDT, DDD, DDE, chlorobenzene, chloroform, chlorinated solvents, chloral, 2-chlorophenol, hexavalent chromium, ammonia, monochlorobenzene	X	X	X	X	
Aventis Crop Science (Rhône-Poulenc)	155	6200 NW St. Helens Rd.	7.3	Former herbicide, insecticide, fertilizer manufacturing	pesticides, herbicides, phenols, VOCs, PAHs, PCBs, arsenic, lead, mercury	X	X	X	X	
Babcock Land Co.	2361	9933 NW 107th Ave.	4.8	Log and lumber storage, steel rail and railroad material storage	unknown	X		no data		
Burlington Northern Santa Fe/Portland Terminal Railroad Company and lessees below										
Northern Hub Center/Quild Lake Railyard	100	3500/3930 NW Yeon Ave		Switching yard, bulk petroleum storage, loading/unloading, locomotive refueling	TPH (diesel), PAHs, benzene, toluene, phenolic compounds, solvents (TCE), metals, possibly creosote constituents	X		X	X	X
1) Kleen Blast (BNSF lessee)				Storage, packing, and distribution of copper slag media, spent abrasive grit blast	see above					
2) Eastman Chemical (current lessee)/McWhorter Technologies/McCloskey Corp.	135	4155 NW Yeon		Chemical storage	see above					
3) Gresham Transfer (BNSF lessee)				Transfer of bulk materials (soda ash, lime, coal, roofing grit, cement, talc, plastic beads, sand, cornstarch) from rail cars to tractor trailers	see above					
4) Vopak/Van Water and Rogers (BNSF lessee) subsidiary of Univar, formerly McKesson Chemical	330	3950 NW Yeon Ave		Chemical supply, packaged and stored chemicals, distilled and recycled solvents	see above					
BNSF Withridge Yard				Staging and loading rail tank cars with petroleum products	see above					
Cascade General (see Swan Island Shipyards)			8.9							
Christensen Oil - Plant No. 1	2426	3821 NW St. Helens Rd.	9.5	Bulk petroleum product storage and transfer	TPH, PAHs, BTEX, copper, lead, zinc	X		no data	X	X
Cherone USA Asphalt Refinery	1281	5501 NW Front Ave.	8.3	Asphalt refining	TPH, BTEX, PAHs, phenolic compounds	X		X	X	X
City of Portland BES Water Pollution Control Lab	2452	6543 N. Burlington Avenue	6.0	Analytical testing laboratory. Former lumber mill				no data		
Columbia American Plating	29	300 NW 35th Ave	9.0	Metal finishing, electroplating	cadmium, chromium, lead, cyanide, zinc, TCE			X		
Columbia River Sand and Gravel - see Linton Plywood	2351	10504 NW St. Helens Rd.	4.8	Sand and gravel storage and distribution, located on Linton Plywood property.	see Linton Plywood ESCI #2373					
Crawford Street Corp. (formerly Columbia Forge and Machine Works, TLS Steel, Lampros Steel)	2363	8424 Crawford St.	6.3	Metal forging, stamping, and fabrication, steel recycling and distribution.	PAHs, PCBs, arsenic, cadmium, chromium, copper, lead, nickel, zinc	X		X		
Equilon Enterprises, LLC (see Texaco)	169	3800 NW St. Helens Road		Bulk petroleum facility	TPH, BTEX, PAHs, MTBE, ethanol, lead	X				
Foss Maritime / Erik Maritime	2364	9030 NW St. Helens Rd.	5.7	Vessel dispatch, fueling, and maintenance	TPH, PAHs, BTEX, VOCs, cadmium, chromium, lead	X		X	X	X
Fred Divine Diving & Salvage Co. (Marine Salvage Consortium, Inc)	2365	6211 N. Ensign	8.2	Storage and maintenance of boats and other marine salvage gear. Vessel refueling. Washing and storage of haz waste transportation equipment from 1989-1996.	PAHs, bis(2-ethylhexyl)phthalate, bis(2-chloroisopropyl)ether, arsenic, cadmium, copper, zinc	X		no data	X	X
Freightliner	115	5400 N. Basin Ave.	8.3	Truck parts manufacturing	toluene, ethylbenzene, xylenes, vinyl chloride, other solvents/thinners (TCE, PCE, DCE)			X	X	
Freightliner	2366	6936 N. Fathom St.	8.3	Truck manufacturing	TPH, PAHs, solvents, antifreeze, phthalate esters, aryl phosphate esters, PCBs, methyl phenols, barium, cadmium, chromium, copper, lead, mercury, zinc			no data		
Front Ave. LLP (Tube Forgings)	1239	5200 NW Front Ave.	8.5	Pipe fitting manufacturing	TPH, VOCs, SVOCs, and metals	X		X		
Front Ave. LLP (CMI/Hampton Lumber)	1239	4950 NW Front Ave.	8.5	Lumber and construction material storage and loading	see above					
Front Ave. LLP/Olacier NW (former Lone Star NW)	2378	5034 NW Front Ave.	8.5	Concrete batch plant	see above					
GASCO (Northwest Natural)	84	7900 NW St. Helens Rd.	6.5	Liquid natural gas production, storage and distribution of creosote oil, coal tar pitch, diesel, and fuel oil products. Formerly oil gasification (Portland Gas & Coke Company).	PAHs, phenols, naphthalene, BTEX, cyanide, arsenic, chromium, copper, lead, nickel, zinc	X	X	X	X	X
GATX/Kinder Morgan Liquid Terminals (formerly GATX ST. Helens Rd facility). Olympic Pipeline transfer station in SW corner of property. Also Santa Fe pipeline	1096	11400 NW St. Helens Rd.	4.0	Bulk petroleum product storage and transfer	TPH, PAHs, lead, BTEX, MTBE, chlorobenzene, dichlorobenzenes		X	X	X	X
General Construction - See Transloader International (ECSI #2367)										
Georgia-Pacific - Linton Fiber Terminal	2370	12222 NW Marina Rd.	3.5	Formerly wood chip export terminal, lumber storage, sawmill, creosoting plant.	TPH, PAHs, possibly arsenic and pentachlorophenol	X		X		X
Goldendale Aluminum Co.	2440	2600 N. River St.	10.0	Alumina off-loading, storage and transfer	metals, possibly PAHs	X		no data	X	X
Quild Industries	49	5909 NW 61st Ave	7.5	Battery manufacturing/recycling	lead					
GS Roofing Products (Gensar)	117	6350 NW Front Ave.	7.3	Manufactures asphalt roofing products	fuel oil, asphalt, benzene, copper, zinc	X				X
Gunderson Inc. (former Schnitzer site, in part)	1155	4350 NW Front Ave.	9.5	Ship dismantling, auto salvage	1,1,1-trichloroethane, PAHs, TPH, waste oil, BTEX, waste solvents, PCBs, metals (lead, chromium, copper, mercury, nickel, and zinc)	X		X	X	
Henden Tow Boats - See Marine Finance (ECSI #2352)	2389									

Table E-1. Facilities in Portland Harbor, Chemicals of Interest and Potential Pathways. (Information compiled from DEQ ECSI database, DEQ strategy recommendations, and site-specific reports).

Facility Name	ECSI #	Address	RM	Type of Industry	Chemicals of Interest (present in upland media or identified by DEQ)	Potential Pathway (current or historic) ¹				
						Stormwater	Wastewater Discharge	Groundwater	Spills/Disposal	Product Handling/Transfer
Kinder Morgan - see OATX (ECSI #1096)										
Koppers Industries, Inc. (see GASCO ECSI #64)	2348	7540 NW St. Helens Rd. (located on Wacker property)	7.0	Creosote and tar pitch distribution						
Lakeside Industries	2372	4850 NW Front Ave	8.5	No information on current use. Former steel factory	unknown	X		no data	unknown	unknown
Linton Oil Fire Training Grounds	1189	NW Marina Way	4.0	No current use. Formerly personnel training for extinguishing flammable fluid fires	TPH, PAHs, benzene, chlorinated solvents, arsenic	X				
Linton Plywood Association (inc. Columbia R. Sand & Gravel)	2373	10504 NW St. Helens Rd.	4.8	Currently inactive. Formerly plywood manufacture	TPH, PAH, phthalates, VOCs, PCBs, cadmium, chromium, copper, lead, zinc	X		X	X	
MarCom, Inc.	2350	8970 N. Bradford St.	5.8	Ship repair, including machining, sandblasting, maintenance	TPH, PAHs, organotins, chlorinated solvents, PCE, arsenic, chromium, copper, lead, mercury, zinc	X		X	X	X
Marine Finance Corporation	2352	8444 NW St. Helens Rd.	6.0	Tug maintenance, storage, houseboat and sailboat construction. Formerly ferry landing, oil storage, metal salvage, other	PAHs, TPH, VOCs, phenols, PCBs, phthalates, SVOCs, butyltins, metals	X		X	X	
McCall Oil & Great Western Chemical	134	5550 NW Front Ave	7.5	Petroleum product storage and transfer	TPH, chlorinated solvents, metals	X		X	X	X
McCormick & Easter Creosoting Company	74	6900 N. Edgewater St.		Currently vacant. Formerly wood treating facility	PAHs, pentachlorophenol, dioxins/furans, arsenic, copper, chromium, cobalt, zinc	X	X	X	X	X
Mobil Oil Terminal	137	9420 NW St. Helens Rd.	5.3	Petroleum storage and distribution	TPH, PAHs, BTEX, arsenic, copper and lead	X		X	X	X
Morse Brothers - see G-P Linton (ECSI #2370)										
Olympic Pipeline Co.	2374	11400 NW St. Helens Rd.	3.5-7.9	Petroleum products pipeline	PAHs, BTEX, TPH				X	X
St. Helens Road Petroleum Contamination	2630	NW St. Helens Road		Soil and GW contam. May be related to Olympic Pipeline leaks	diesel, heavy oil, gasoline, PAHs, BTEX			X		
Oregon Steel Mills - Rivergate	141	14400 N. Rivergate Blvd	3.0	Steel mill, steel plate and coil manufacturing	TPH, PCBs, VOCs, and metals	X		X	X	
Owens Corning - Linton	1836	11444 NW St. Helens Rd.	4.2	Asphalt and roofing manufacturer. Formerly wood treating and lumber related uses	TPH, PAHs, arsenic, PCP	X				X
Portland Gas Manufacturing	1138	NW 2nd Aven	12.0	Currently inactive. Formerly coal/gas manufacturing	contaminants associated with other coal gas facilities include PAHs, TPH, BTEX, heavy metals, SVOCs				X	X
Portland General Electric - Harborton Substn.	2353	12430 & 12500 NW Manna Way	3.5	Electrical substation	TPH, PAHs. Possible (unconfirmed) chemicals include PCBs, BTEX, phthalates, PCP, and herbicides	X		X		
Portland Shipyard - Swan Island	271	NA	9.0	Ship repair, dry dock	PAHs, TPH, PCBs, VOCs, chlorinated solvents, metals, organotins	X	X	X	X	X
Port of Portland-Terminal 1 North	3377	2200 NW Front Ave	10.5	Multiple lessees: aluminum window assembly, warehousing of building products, service dock for tour boats, paper product, lumber and wood products storage	TPH	X		X	X	X
Port of Portland-Terminal 1 South	2642	2100 NW Front Ave	10.5	Multiple lessees: refractory brick manufacture, patrol boat moorage, laminated wood products manufacturing	TPH, PAHs, phthalates, metals, VOCs, herbicides, pesticides, PCBs, organotins	X		X	X	X
Port of Portland-Terminal 2	2769	3556 NW Front Ave	10.0	Cargo (steel, lumber, plywood, and pulp) and container shipping and handling	TPH, PCBs	X				X
Port of Portland-Terminal 4 - Slip 3	272	10400 N. Lombard	4.7	Marine shipping and handling	TPH, PAHs, BTEX	X		X	X	X
Port of Portland-Terminal 4 - Toyota Motor Sales	172	10400 N. Lombard	5.0	Vehicle processing, shipping and unloading of autos	PAHs	X				
Port of Portland-Terminal 4 - Slip 1	2356	N. Lombard St.	4.3	Shipping terminal for grain, breakbulk cargoes, logs, minerals, liquid bulks	SVOCs, PAHs, cadmium, chromium, lead, mercury, zinc	X		no data		X
Port of Portland-Terminal 5 (Blue Lagoon)	1686	North Lombard Street	1.0	Currently grain terminal, bulk mineral shipping, and fiber optic submarine cable manufacture. Formerly OSM slag disposal	iron and manganese in groundwater; metals and PCBs at low levels	X				
PortShaver Oil Sump	none	adjacent to Oregon Steel Mills main facility (sw corner)	2.5	No current use. Formerly oily bilge wastewater discharge into ponds	TPHs	X		X	X	X
RK Storage & Warehousing	2376	10225 NW Front Ave	4.5	Current use unknown. Formerly log and lumber storage, also sand blast grt. West Coast Adhesives (ECSI #333) manufactured phenol formaldehyde glues on northern portion of property	TPH, formaldehyde, phenolics, phthalate esters	X		X	X	
Ross Island	2409	4315 SE McLoughlin Blvd	15.4	Disposal of contaminated dredged material	PCBs, PAHs, petroleum, metals, pesticides, herbicides					
Santa Fe Pipelines (purchased by Kinder-Morgan)	2104	6565 NW St. Helens Rd.	7.0	Fuel pipeline	TPH, PAHs, BTEX	X			X	
Schnitzer Investment Corp. (North Burgard Site)			3.7	Multiple lessees						
Schnitzer Steel	2355	12005 N. Burgard Rd.	3.7	Ship dismantling, scrap metal recycling, including automobiles	Metals, PAHs, PCBs, TPHs, solvents	X		X		
Boydston Metal Works	2362	9002 N. Sever Court	3.7	Fabrication and painting of automobile transport trailers	Metals, TPH, solvents, PCBs	X		X		
Cal Bag Metals	2454	4927 NW Front Ave	3.7	Staging area for recycling non-ferrous metals	diesel fuel storage on site	X			X	X
Morgan			3.7	Storage and distribution of urea and wood products for overseas shipment. Historically used for log storage	fuel stored on site	X		X	X	
Northwest Pipe and Casing	138	12005 N. Burgard St.	3.7	Pipe manufacturing and coating	PCBs, oil, gasoline, PAHs, solvents	X		X		
Portland Blast Media			3.7	Sandblasting, manufacture of protective coatings for recycling containers	Metals, solvents, paints	X		X	X	X
Portland Container Repair	2375	9449 N. Burgard Way	3.7	Storage and maintenance of intermodal containers and chassis	Oil, solvents, fuel	X		X		
Premier Edible Oils	2013	10400 N. Burgard Way	3.7	Food grade product storage	TPH, PAHs, BTEX, chlorinated solvents	X		X		
Romar Transportation Systems	2437	9333 N. Time Oil Rd.	3.7	Warehousing	PCBs	X		no data	X	
Ryerson Steel	2441	9040 N. Burgard Way	3.7	Manufacture and distribution of structural steel products	no data	X		X		
Jefferson Smurfit	2371	9930 N. Burgard Way	3.7	Unknown	unknown	X		no data		

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						Stormwater	Wastewater Discharge	Groundwater	Spills/Disposal	Product Handling/Transfer
Western Machine Works			3.7	Metal machining, fabrication for industrial parts (primarily pulp and paper industry)	TPH, PAHs, metals, solvents, waste oils and paints	X		X	X	X
Schnitzer-Doane Lake (Air Liquide American Corp.)	395	6529 NW Front Ave		Acetylene manufacturing, disposal of auto shredder waste from other Schnitzer facilities	calcium hydroxide, lead, arsenic, TPH, PCBs, chlorinated solvents (TCA, acetone, MEK, 1,1-DCA)	X	X	X	X	
Schnitzer-Moody Ave site	875	SW Moody Avenue		Currently vacant. Formerly ship dismantling, auto shredding, metals salvaging, process, pesticide manufacturing	DDTs, hexachloropentadiene, PCBs, TCE, acetone and other solvents, metals, PAHs	X		X	X	
Schnitzer-Katridge site	2442	4959 NW Front Avenue	8.5	No info.						
Schnitzer-near NW Yeon (formerly Chase Bag, Great Western Chemical and Willard Storage Battery)		3720 NW Yeon Ave		Former multi-wall bag construction, hardware wholesale, chemical manufacture, storage battery manufacture	chlorinated solvents (possibly PCE DNAPL), metals (particulate lead)	X		X	X	X
Shaver Transportation Co	2377	4900 NW Front Ave	8.5	Tug dispatch, refueling and maintenance	materials handled on site include diesel fuel, paints, oils and solvents	X			X	X
South Rivergate Industrial Park - see Terminal 5 (ECSI #1686), Oregon Steel Mills (ECSI #141)	2980	N. Rivergate Blvd	<3.5							
Bulzer Bingham Pump	1235	2800 NW Front Ave		Pump manufacturing	petroleum products, chlorinated solvents, including BTEX, zinc	X		X	X	
Texaco Portland Bulk Pipeline	2117	4350 Front Ave. (Gunderson)		Petroleum product transfer	TPH, PAHs, BTEX, MTBE, lead	X		X	X	
Texaco Portland Bulk Terminal (see Equilon ECSI #169)										
Time Oil-Northwest Terminal	170	10350 N. Time Oil Rd	3.8	Former bulk petroleum storage facility	TPH, BTEX, PAHs, PCP and other chlorinated phenols, dioxins/furans, metals, PCBs	X		X	X	X
Time Oil-Linton Terminal	1989	9400 NW St. Helens Rd	5.5	Bulk petroleum storage facility	TPH (gasoline), PAHs, BTEX				X	X
Triangle Park LLC	277	5828 N. Van Houten Pl.	7.5	Currently inactive. Former lumber mill, petroleum pipeline, fuel storage, marine construction, hazardous waste storage from 1908 to 1984.	metals, PCBs, chlorinated solvents, PAHs, pentachlorophenol, possibly dioxins	X		X		
Transloader Intl. Co. (aka Marine Finance Corp ECSI 2352, Hendron Tow Boat #2389)	2367	8444 NW St. Helens Rd	6.0	Current use unknown. Formerly log storage. No other information.	no upland data, sediments do not appear to be impacted			no data		
Trumbull Asphalt Plant	1160	3605 NW 35th Ave		Asphalt manufacturing	petroleum hydrocarbons, diesel fuel, asphalt distillate	X		X	X	X
U.S. Coast Guard - Portland Station	1338	6767 North Barn Ave	8.3	Docking, servicing and refueling of small boats. Limited sandblasting.	TPH, PAHs, metals (including mercury, tributyltin), possibly solvents, herbicides	X			X	X
U.S. ACOE-Portland Moorings	1641	8010 NW St. Helens Rd	6.2	Maintenance and repair of Corps vessels	TPH, PAHs, metals including TBT	X		no data	X	X
Union Pacific Railroad-Albina Yard	178	2745 N. Interstate Ave	10.0	Railroad yard, rail car painting and maintenance, locomotive refueling	TPH, PAHs, other SVOCs, VOCs, metals, butyltins, PCBs	X		X	X	
Union Pacific Railroad pipeline and St. Johns tank farm	2017	6908 N. Roberts Ave		Currently vacant. Former bulk fuel facility. Pipeline extends to Terminal 4 - Slip 3.	TPH, PAHs, BTEX	X		X	X	X
Wacker Siltronic Corp.	183	7200 NW Front St.	7.0	Semiconductor manufacturing. Site has been impacted by past disposal practices at GASCO and Olympic Pipeline that transits the site.	PAHs, phenols, chlorinated solvents, BTEX, metals		X	X	X	X
Willamette Cove/St. Johns Riverfront	2066	N. Edgewater St.	7.0	No current use, proposed greenbelt. Formerly various industrial, including wood and lumber-related activities, dry dock, coal off-loading	TPH, PAHs, TBT, PCP, PCBs, solvents, metals	X		X	X	X
Willbridge Bulk Fuel Area (includes facilities listed below). Olympic Pipeline and Santa Fe Pipeline also cross facility.	1549	NW Doane Ave	7.8	Petroleum product storage and distribution. Includes three separately owned parcels.	TPHs, PAHs, BTEX, chlorinated and non-chlorinated solvents, DDT	X		X	X	X
Kinder Morgan (formerly GATX, formerly Shell)	160	5880 NW St. Helens Rd		Historically, pesticide, nonchlorinated solvents, ammonia, ethylene glycol, asphalt products storage at GATX.	see above					
TOSCO (formerly UnoCal)	177	5528 NW Doane Ave		Petroleum product storage and distribution	see above					
Chevron	25	5531 NW Doane Ave		Historically, naphtha solvents	see above					
Zidell	689	3121 SW Moody Ave	14.0	Ship dismantling, barge construction, tube forging	metals, PCBs, TPH, chlorinated solvents, TBTs, asbestos	X		unknown	X	X

¹X = possible pathway, additional data may be required to confirm

Table E-2a. List of Non-city Outfalls Compiled by City of Portland in 2001.
 (Note: includes both active and abandoned outfalls).

City Designation ^a	Adjacent Business Name ^b	Outfall Diameter	Outfall Material
1	Sulzer Bingham	12"	composite
2	Sulzer Bingham	24"	steel
3	Sulzer Bingham	15"	steel
4	Sulzer Bingham	24"	composite
5	Sulzer Bingham	48"	steel
6	Rhone Poulanc	6"	steel
7	Tube Forgings		
8	McCall Oil	24"	composite
9	McCall Oil		
10	McCall Oil	8"	composite
11	Great Western Chemical	12" & 6"	pvc
12	Tosco	4"	pvc
13	Kinder Morgan T5	24"	composite
14	Chevron Transportation	4"	steel
15	NW Paper Box Mfg	10"	steel
16	NW Paper Box Mfg	10"	csp
17	Prodica	12"	composite
18	Prodica	12"	composite
19	Ash Grove Cement	24"	composite
20	Kinder Morgan T4	24"	composite
21	Schnitzer Steel (Premier Edible Oils)	36"	sump
22	Oregon Steel Mills	36"	steel
23	Oregon Steel Mills	24"	composite
24	Oregon Steel Mills	36"	pvc
25	Arco	6"	steel
26	Arco	4"	steel
27	Arco	6"	steel
28	GS Roofing/CertainTeed	10"	composite
29	GS Roofing/CertainTeed	24"	composite
30	Port of Portland	8"	composite
31	Port of Portland	8"	composite
32	Port of Portland	8"	composite
33	Port of Portland	8"	composite
34	Port of Portland	8"	composite
35	Port of Portland	8"	composite
36	Port of Portland	8"	composite
37	Port of Portland	8"	composite
38	Port of Portland		
39	Port of Portland	8"	composite
40	Cascade General	8"	composite
41	Cascade General		composite
42	Cascade General	8"	composite
43	Cascade General	8"	composite
44	Cascade General	24"	composite
45	Cascade General	18"	composite
46	Cascade General	18"	composite

Table E-2a. List of Non-city Outfalls Compiled by City of Portland in 2001.
(Note: includes both active and abandoned outfalls).

City Designation ^a	Adjacent Business Name ^b	Outfall Diameter	Outfall Material
47	Cascade General	12"	composite
48	Cascade General	12"	composite
49	Cascade General	18"	composite
50	Cascade General	10"	composite
51	Cascade General	18"	composite
52	Cascade General	10"	steel
53	Cascade General	18"	composite
54	Cascade General	10"	
55	Cascade General		
56	Cascade General		
57	Cascade General	18"	composite
58	Cascade General	8"	steel
59	Cascade General	8"	composite
60	Cascade General	8"	composite
61	Cascade General	12"	composite
62	Cascade General	18"	composite
63	Cascade General	10"	composite
64	Cascade General	10"	composite
65	Cascade General	10"	composite
66	Wacker Siltronic		
67	Wacker Siltronic		
68	Eastern Oregon Fast Freight	12"	
69	Dallas & Mavis	12"	pvc
70	Christianson Elect/Gourmet Deli/UPS		
71	Dallas & Mavis/Foster Farms	9"	csp
72	Dallas & Mavis/Foster Farms	4"	pvc
73	Dallas & Mavis/Foster Farms	6"	pvc
74	Dallas & Mavis/Foster Farms	6"	pvc
75	Olympic Pipeline/GATX	15"	composite
76	Olympic Pipeline/GATX	4"	steel
77	Olympic Pipeline/GATX	15"	composite
78	Mobil Oil	15"	steel
79	Owens Corning Trumble	36"	csp
80	Owens Corning Trumble	24"	csp
81	Owens Corning Trumble	20"	steel
82	Schnitzer/Smurfit	18"	csp
83	Schnitzer/Smurfit/Morgan CFS	30"	
84	Schnitzer/Smurfit/Morgan CFS	30"	
85	Schnitzer Steel (Premier Edible Oils)	10"	csp
86	Marcom	8"	steel
87	US Army Corps of Engineers	4"	steel
88	US Army Corps of Engineers	4"	steel
89	US Army Corps of Engineers	6"	pvc
90	US Army Corps of Engineers	30"	steel
91	US Army Corps of Engineers	6"	pvc&composite
92	US Army Corps of Engineers	6"	pvc

Table E-2a. List of Non-city Outfalls Compiled by City of Portland in 2001.
(Note: includes both active and abandoned outfalls).

City Designation ^a	Adjacent Business Name ^b	Outfall Diameter	Outfall Material
93	US Army Corps of Engineers	12"	steel
94	US Army Corps of Engineers	8"	steel
95	ATOFINA Chemicals	36"	fiberglass
96	ATOFINA Chemicals	36"	fiberglass
97	ATOFINA Chemicals	24"	fiberglass
98	ATOFINA Chemicals	30"	fiberglass
99	ATOFINA Chemicals Abandoned Outfall	24"	csp
100	ATOFINA Chemicals Abandoned Outfall	24"	steel
101	ATOFINA Chemicals Abandoned Outfall	36"	csp
102	Linnton Plywood	48"	csp
103	Linnton Plywood	18"	steel
104	Linnton Plywood	18"	composite
105	Linnton Plywood	18"	composite
106	Linnton Plywood	4",3",6"	
107	NW Natural Gas	12"	composite
108	Schnitzer Steel	24"	steel
109	Schnitzer Steel	24"	steel
110	Schnitzer Steel	24"	steel
111	Schnitzer Steel	30"	steel
112	Schnitzer Steel	24",12"	steel
113	Schnitzer Steel	45"	
114	Schnitzer Steel		
115	Schnitzer Steel		
116	Schnitzer Steel		
117	Schnitzer Steel		
118	Schnitzer Steel		
119	Schnitzer Steel		
120	Schnitzer Steel		
121	Schnitzer Steel		
122	Schnitzer Steel		
123	Ryerson/NW Pipe Co.	48"	csp
124	Schnitzer Steel	30"	steel
125	Schnitzer Steel/Ryerson	6"	csp
126	Linnton Plywood	36"	composite
127	Gunderson	6"	composite
128	Gunderson	6"	composite
129	Gunderson	6"	composite
130	Gunderson	6"	composite
131	Gunderson	6"	composite
132	Gunderson	6"	composite
133	Gunderson	6"	
134	Gunderson	12"	
135	Gunderson	10"	
136	Gunderson	8"	
137	Gunderson	10"	
138	Gunderson	6"	csp

Table E-2a. List of Non-city Outfalls Compiled by City of Portland in 2001.
(Note: includes both active and abandoned outfalls).

City Designation ^a	Adjacent Business Name ^b	Outfall Diameter	Outfall Material
139	Gunderson	6"	composite
140	Gunderson	6"	composite
141	Gunderson	6"	composite
142	Gunderson	6"	composite
143	Gunderson	6"	composite
144	Gunderson	6"	composite
145	Gunderson	6"	composite
146	Gunderson	6"	composite
147	Gunderson	6"	composite
148	Gunderson	6"	pvc
149	Gunderson	6"	composite
150	Gunderson		
151	Time Oil Rivergate	12"	csp
152	Time Oil Linnton	6"	composite
153	Morse Brothers	36"	csp
154	International Raw Materials	6"	pvc
155	Cascade General	24"	composite
156	Cascade General	18"	
157	Cascade General		
158	Port of Portland	18"	steel
159	Port of Portland	12"	steel
160	Port of Portland	6"	steel
161	Port of Portland	8"	steel
162	Port of Portland	18"	composite
163	Port of Portland	12"	composite
164	Port of Portland	18"	csp
165	Alcatel	24"	composite
166	Port of Portland	24"	
167	Port of Portland	18"	
168	Port of Portland	36"	
169	Port of Portland	24"	
170	Port of Portland	6"	
171	Port of Portland	8"	
172	Port of Portland		
173	Port of Portland	3"	
174	Port of Portland		
175	Port of Portland		
176	Port of Portland	10"	
177	Port of Portland	18"	
178	Port of Portland	21"	
179	Port of Portland	21"	
180	Port of Portland	21"	
181	Port of Portland	15"	
182	Port of Portland	18"	
183	Port of Portland	21"	
184	Port of Portland	10"	

Table E-2a. List of Non-city Outfalls Compiled by City of Portland in 2001.
(Note: includes both active and abandoned outfalls).

City Designation ^a	Adjacent Business Name ^b	Outfall Diameter	Outfall Material
185	Eastern Oregon Fast Freight	12"	
186	Eastern Oregon Fast Freight	12"	
187	Schnitzer Property	12"	composite
188	Schnitzer Property	10"	csp
189	Metro Property	24"	composite
190	Metro Property	6"	csp
191	Metro Property	4"	steel
192	Metro Property	4"	steel
193	Metro Property	5 Ofs	
194	McCormick & Baxter Abandoned		
195	McCormick & Baxter		
196	McCormick & Baxter Abandoned		
197	McCormick & Baxter Abandoned		
198	US Coast Guard	15"	composite
199	US Coast Guard	10"	composite
200	US Coast Guard	12"	composite
201	US Coast Guard	12"	composite
202	Arco/Mobil	60"	composite
203	Arco/Linnton Plywood	36"	composite
204	Olympic Pipeline/GATX	24"	
205	US Army Corps of Engineers	24"	steel
206	US Army Corps of Engineers	24"	csp
207	ODOT	24"	
208	ODOT	18"	steel
209	Mobil Oil	48"	
210	Foss Abandoned		
211	Stan Wagner	36"	composite
212	Foss Maritime		csp
213	Culvert	24"	composite
214	Reidel	6"	steel
215	Reidel	15"x2	steel
216	Savage Industries	12"	
217	Union Pacific RR	18"	
218	Union Pacific RR	30"	composite
219	Marcom	18"	steel
220	Fort James	30"	csp
221	Fort James	30"	csp
222	Port of Portland T1	2"	
223	Riverscape LLC	6"	
224	Riverscape LLC	12"	
225	Riverscape LLC	12"	
226	Riverscape LLC	12"	
227	Port of Portland T1	15"	
228	Port of Portland T1	8"	
229	Port of Portland T1	6"	
230	Port of Portland T1 (leased to other party)	15"	

Table E-2a. List of Non-city Outfalls Compiled by City of Portland in 2001.
(Note: includes both active and abandoned outfalls).

City Designation ^a	Adjacent Business Name ^b	Outfall Diameter	Outfall Material
231	Port of Portland T1 (leased to other party)	6"	
232	Port of Portland T1 (leased to other party)	15"	
233	Port of Portland T1 (leased to other party)	8"	
234	Port of Portland T1	6"	
235	Port of Portland T2	27"	
236	Port of Portland T2	36"	
237	Morse Brothers	12"	csp
238	Morse Brothers		
239	Morse Brothers	24"	csp
240	Goldendale Aluminum	12"	composite
241	Goldendale Aluminum	12"	composite
242	Goldendale Aluminum	12"	composite
243	Goldendale Aluminum		
244	Goldendale Aluminum		
245	Goldendale Aluminum		
246	University of Portland	24"	composite
247	University of Portland	12"	composite
248	Reidel	18"	steel
249	Shenanigans/Freightliner	36"	composite
250	Freightliner	12	composite
251	Freightliner	12"	composite
252	Freightliner	8"	pvc
253	Freightliner	12":	composite
254	Freightliner	12"	steel
255	McCormick & Baxter		
256	Hampton Lumber	18"	csp
257	Hampton Lumber	18"	csp
258	Portland Fire Bureau	10"	pvc
259	Fort James	12"	csp
260	Fort James	12"	csp
261	Fort James	12"	csp
262	Fort James	12"	csp
263	Fort James	12"	csp
264	Fort James	12"	csp
265	Fort James	12"	csp
266	Fort James	12"	csp
267	Fort James	12"	csp
268	Fort James	12", 6"	csp
269	Fort James	12"	csp
270	Fort James	12"	csp
271	Fort James	12"	csp
272	Fort James	12"	csp
273	Fort James	12"	csp
274	Fort James	12"	csp
275	Fort James	12"	csp
276	Fort James	12"	csp

Table E-2a. List of Non-city Outfalls Compiled by City of Portland in 2001.
(Note: includes both active and abandoned outfalls).

City Designation ^a	Adjacent Business Name ^b	Outfall Diameter	Outfall Material
277	Fort James	12"	csp
278	Fort James	12"	csp
279	Fort James	12"	csp
280	Fort James	12"	csp
281	Fort James	12"	csp
282	Sakrete of Pacific NW	4"	pvc
283	Sakrete of Pacific NW	15"	composite
284	Pacific Terminal Services/emergency outfall	12"	hose
285	Pacific Terminal Services	4"	steel
286	Marcom abandoned	4"	pvc
287	Wacker Siltronic	12"	
288	US Army Corps of Engineers	6"	pvc
289	Dallas Mavis	10"	csp
290	Atofina	24"	metal
291	Sakrete	6"	csp
292	McCormick Pier Apartments	10"	csp
293	McCormick Pier Apartments	12"	composite
294	McCormick Pier Apartments	4"	metal
295	McCormick Pier Apartments	10"	csp
296	McCormick Pier Apartments	4"	metal
297	McCormick Pier Apartments	4"	metal
298	McCormick Pier Apartments	4"	metal
299	McCormick Pier Apartments	4"	metal
300	McCormick Pier Apartments	10"	csp
301	McCormick Pier Apartments	2"	metal
302	McCormick Pier Apartments	4"	metal
303	McCormick Pier Apartments	4"	pvc
304	McCormick Pier Apartments	4"	pvc
305	McCormick Pier Apartments	4"	plastic
306	ODOT	48"	csp
307	ODOT	48"	csp
308	ODOT	15"	csp
309	ODOT	36"	composite
310	ODOT	30"	composite
311	ODOT	12"	composite
312	ODOT	18"	composite
313	ODOT	18"	composite
314	ODOT	18"	composite
315	ODOT	24"	composite
316	ODOT	18"	composite
317	ODOT	18"	composite
318	ODOT	18"	composite
319	ODOT	15"	composite
320	ODOT	15"	composite
321	ODOT	15"	CSP
322	ODOT	15"	

Table E-2a. List of Non-city Outfalls Compiled by City of Portland in 2001.
(Note: includes both active and abandoned outfalls).

City Designation ^a	Adjacent Business Name ^b	Outfall Diameter	Outfall Material
323	ODOT	42"	composite
324	ODOT	42"	csp
325	Albers Mill	12"	pvc
326	Albers Mill		
327	Columbia Grain	16"	csp
328	Columbia Grain	16"	csp
329	ADM		
330	ADM		
331	ADM		
332	ADM		
334	ADM		
335	ADM		
336	ADM		
337	ADM		
338	ADM		
339	ADM		
340	ADM		
341	Cargill	6"	pvc
342	Cargill	6"	pvc
343	Cargill	6"	pvc
344	Cargill	6"	pvc
345	Cargill	8"	pvc
346	Cargill	24"	metal
347	Fuel & Marine Marketing Abandoned	12"	valve
348	Louis Dreyfus		
349	Louis Dreyfus		
350	Glacier NW	12"	plastic
351	Glacier NW	12"	pvc
352	Glacier NW	12"	pvc
353	Glacier NW	6"	metal
354	Unknown Abandoned	6"	pvc

^aThe complete outfall designation number contained in City of Portland files included the prefix "WP" before the number.

^bAdjacent business names are provided only to assist in locating the outfall. The listed business may or may not discharge via the outfall.

Table E-2b. List of City Outfalls (CH2M Hill 2000a,b; Sanders 2003).

City Designation Within the ISA	Discharge Type	Outfall Diameter	Construction Date
M1	Stormwater	60"	1964
M2	Stormwater	n/a	n/a
M3	Stormwater	60"	1989
S1	Stormwater	36"	1964
S2	Stormwater	36"	1963
S5	Stormwater	36"	1963
S6	Stormwater	36"	1964
18	Stormwater	72"	1955
19	Stormwater	42"	1977
22	Stormwater	60"	1973
22B	Stormwater	48"	1980
22C	Stormwater	84"	1978
24	Emergency Bypass	12"	<1923
48	Stormwater	n/a	1948
49	Stormwater	n/a	1997
50	CSO	n/a	1906
52	CSO	30"	1990 ^a
52A	Stormwater	36"	1972
53	CSO	n/a	1970
Outside the ISA			
11	CSO	n/a	n/a
12	Stormwater	n/a	n/a
13	CSO	n/a	n/a
14	Stormwater	n/a	n/a
15	CSO	n/a	n/a
16	Stormwater	n/a	n/a
17	CSO	n/a	n/a
43	CSO	n/a	n/a
44	Stormwater	n/a	n/a
45	Stormwater	n/a	n/a
46	CSO	n/a	n/a
47	CSO	n/a	n/a
10A	Stormwater	n/a	n/a
44A	CSO	n/a	n/a
53A	Stormwater	n/a	n/a

^aDrainages for Outfalls 51 and 52 were combined in 1990; original Outfalls 51 and 52 were constructed in 1920 and 1976, respectively.

Table E-3a. Spills to the Lower Willamette River from DEQ's Spill Information Network.

YR	OERS Site Name	Address	City	Date	Description
95	53 EMANUAL HOSPITAL	2801 N GANTENBEIN	PORTLAND	29DEC1994	DID NOT REPORT BECAUSE THEY WERE NOT SURE WHERE THE OIL WENT. INSPECTION CORINGS DETERMINED OIL WS RELEASED UNDER CONCRETE SLAB UNDER PARKING STRUCTURE.
95	136 PORT OF PORTLAND	3556 NW FRONT AVE TERMINAL 2	PORTLAND	15JAN1995	CRANE OPERATOR LOST LOAD OF PALLETS OF PAINT & THINNERS
95	149 GATX WILLBRIDGE TERMINAL	5880 NW ST HELENS RD	PORTLAND	17JAN1995	DRIVER PULLED AWAY WITH LOADING ARM STILL ATTACHED
95	145 FOSS MARITIME	9030 NW ST HELENS RD	PORTLAND	18JAN1995	TUG BOAT LEAKED AROUND SHAFT ALLEY
95	335 PORTLAND HAZ MAT	SE 82ND & BURNSIDE	PORTLAND	16FEB1995	CONST. PROJECT BROKE NATURAL GAS LINE
95	381 LINNTON PLYWOOD	10504 NW ST HELENS RD	LINNTON	17FEB1995	COMPLAINANT CALLED IN OIL SPILL
95	352 GATX	5880 NW ST HELENS RD	PORTLAND	18FEB1995	PIN HOLE IN LINE
95	604 AIR LIQUID	6529 NW FRONT AVE	PORTLAND	21FEB1995	MALFUNCTIONING OIL/WATER SEPARATOR RESULTED IN RELEASE OF OIL
95	440 UNOCAL	5528 NW DOANE	PORTLAND	02MAR1995	NIPPLE TANK COCK BROKE
95	486 FOSS ENV.	9030 NW ST HELENS RD	PORTLAND	09MAR1995	POWER STEERING LINE BROKE SPILLING FLUID
95	480 ELF ATOCHEM	6400 NW FRONT	PORTLAND	09MAR1995	LEAK IN FEED LINE TO BOILER
95	491 TRUGREEN CHEMICALS	1405 NE 78TH	PORTLAND	11MAR1995	VALVE LEFT OPEN DURING TRANSFER FROM TANKS
95	512 CITY OF PORTLAND	2839 SW SAM JACKSON PARK RD	PORTLAND	15MAR1995	ROCK SLIDE BURIED 3 TRANSFORMERS, BREAKING 1
95	1067 BIGHAUS PETROLEUM & ENV.	1125 SE MADISON	PORTLAND	31MAR1995	TANK ROLLED OVER DURING REMOVAL RELEASING RESIDUAL FILL

Table E-3a. Spills to the Lower Willamette River from DEQ's Spill Information Network.

YR	OERS Site Name	Address	City	Date	Description
95	661 NW NATURAL GAS LEAK OF LIQUID SALT FROM SALT BATH HEATER	7900 NW ST HELENS RD	PORTLAND	06APR1995	
95	658 SOUTHERN PACIFIC R.R. RAIL CAR LEAKED 1 PT OF BATTERY ACID	SE 19TH & SE HOLGATE	PORTLAND	06APR1995	
95	677 SP RAIL ROAD DERAILMENT WITHIN SWITCHING YARD	5424 SE MCLAUGHLIN	PORTLAND	09APR1995	
95	748 UNION PACIFIC PARKED LACOMOTIVE HAS LEAK IN OIL PAN	1135 N KNOTT ST	PORTLAND	20APR1995	
95	777 NW NATURAL GAS UTILITY EXCAVATION IN STREET		PORTLAND	24APR1995	
95	776 PORTLAND FIRE DEPT OIL FOUND INSIDE BOOM AT OUTFALL		PORTLAND	24APR1995	
95	820 PACIFIC STATES GALVANIZING WATER LEFT ON CAUSED TANK TO OVERFLOW	820 NW 15TH ST	PORTLAND	30APR1995	
95	834 ARCO OIL A LEAK DETECTED IN GASOLINE LINE	9930 NW ST HELENS RD	PORTLAND	04MAY1995	
95	894 WASHINGTON PARK ZOO TINT COLOR WASHED INTO STORM DRAIN	4001 SW CANYON RD	PORTLAND	11MAY1995	
95	913 MOBIL THE PIPE FOR BARGE LOADING STARTED LEAKING AT A COUPLING GASKET	9420 NW ST HELENS RD	PORTLAND	14MAY1995	
95	923 GATX	5880 NW ST HELENS RD	PORTLAND	16MAY1995	
95	927 TEXACO BULK TERMINAL DRIVER FORGOT TO CLOSE VALVE	3800 NW ST HELENS RD	PORTLAND	17MAY1995	
95	899 PORT OF PORTLAND HYDRAULIC TOP LOADER	7201 N MARINE DR	PORTLAND	19MAY1995	
95	981 HAZ MAT TEAM TANKER ACCIDENT	I-5 NORTHBOUND	PORTLAND	25MAY1995	
95	991 DARIGOLD	2720 SE 6TH AVE	PORTLAND	26MAY1995	

Table E-3a. Spills to the Lower Willamette River from DEQ's Spill Information Network.

YR	OERS Site Name	Address	City	Date	Description
APPROX 70 LBS OF AMMONIA LEAKED TO HOLDING TANK					
95	1010 TIME OIL TANKER FILLING UST WHEN HOSE RELEASED	5200 BLOCK SW MACADAM	PORTLAND	29MAY1995	
95	1025 PORT OF PORTLAND VANDALS TOOK PIECE OF TRANSFORMER CAUSING IT TO LEAK	TERMINAL 5	PORTLAND	30MAY1995	
95	1046 EXCAVATORS HIT PIPELINE	5739 NE SELLNER	PORTLAND	02JUN1995	
95	1147 McDONALDS CONTAINER OF OIL & GREASE DROPPED & RUPTURED	1035 SW 6TH	PORTLAND	15JUN1995	
95	1159 MCCALL OIL PUMP GASKET FAILURE	5480 NW FRONT	PORTLAND	16JUN1995	
95	1168 PORTLAND FIRE BUREAU PASSENGER CAR COLLIDED W/FUEL TANK OF RYDER TRUCK		PORTLAND	17JUN1995	
95	1175 FOSS MARITIME BILGE PUMPING INTO WATER FROM TUGBOAT KNAPPTON - TOO LATE TO RECOVER	9030 NW ST HELENS ROAD	PORTLAND	19JUN1995	
95	1206 SUNSHINE DAIRY MAY HAVE BEEN AMMONIA RELEASE	801 NE 21ST	PORTLAND	25JUN1995	
95	1240 ARCO STORAGE TERMINAL TRANSFERRING DIESEL OIL FROM DOCK TO BARGE	9930 NW ST HELENS RD	PORTLAND	30JUN1995	
95	1280 WEST COAST SHIPPING SLOW DRIP FROM RIVET IN BUNKER FUEL TANK OF SHIP "CORNUCOPIA"	RIVERGATE BLVD	PORTLAND	06JUL1995	
95	1362 FOSS MARITIME SPILLAGE FROM LINES DURING REFUELING	ST HELENS RD	PORTLAND	15JUL1995	
95	1391 CHEMAX CHEMICAL REACTION CAUSED FIRE (HYD. FLUID DRIPPING ONTO SODIUM CHLORITE)	5700 NW FRONT	PORTLAND	19JUL1995	
95	1450 FREIGHTLINER EMPLOYEE LEFT VALVE OPEN	6936 N FATHOM	PORTLAND	24JUL1995	
95	1512 ELFATOCHM WET THERMISTER CRACKED	6400 NW FRONT AVE	PORTLAND	01AUG1995	

Table E-3a. Spills to the Lower Willamette River from DEQ's Spill Information Network.

YR	OERS Site Name	Address	City	Date	Description
95	1525 HAZMAT 6		PORTLAND	03AUG1995	TRACTOR TRAILER SADDLE TANK BROKE - RELEASING FUEL
95	1540 OLYMPIC TUG & BARGE	2720 NW 35TH	PORTLAND	07AUG1995	PRODUCT SPILLED DURING TRANSFER FROM SHIP TO BARGE
95	1555 PGE	121 SW SALMON	PORTLAND	07AUG1995	SQUIRREL CAUSED SHORT/RUPTURE IN TRANSFORMER
95	1581 ARCO PRODUCTS	9930 NW ST HELENS RD	PORTLAND	10AUG1995	GASKET FAILURE IN NONPRESSURIZED PIPELINE
95	1629 CARGILL GRAIN	800 N RIVER	PORTLAND	18AUG1995	UNKNOWN SOURCE
95	1701 UNOCAL	5528 NW DOANE AVE	PORTLAND	26AUG1995	LINE PREPARED FOR DEMOLITION HAD HOLE ALLOWING RELEASE OVER WEEKEND
95	1698 SUNRISE SHIPPING	121 SW SALMON	PORTLAND	27AUG1995	DEBALLASTING
95	1718 AERO TRANSPORT	6350 NW FRONT	PORTLAND	30AUG1995	LOOSE DOME COVER ON TANK
95	1727 INTERNATIONAL TERMINAL	12005 N BURGARD	PORTLAND	31AUG1995	SHEEN ON RIVER - NOT DIESEL BUT GLOBS
95	1804 SUNRISE SHIPPING	121 SW SALMON	PORTLAND	12SEP1995	BALLAST WATER BEING RELEASED CONTAINED OIL
95	1818 CHEVRON	5501 NW FRONT	PORTLAND	13SEP1995	RUPTURED PIPE
95	1892 WACKER SILTRONICS	7200 NW FRONT	PORTLAND	24SEP1995	FITTING RELEASED AMMONIUM HYDROXIDE
95	1926 UNOCAL	14003 N RIVERGATE	PORTLAND	27SEP1995	VAPOR FLARE FAILURE CAUSED RELEASE
95	1984 HERCULES	NW YEON	PORTLAND	06OCT1995	THICK BROWN OIL
95	2006 CASCADE GENERAL	5555 NW CHANNEL	PORTLAND	09OCT1995	oil in lines used to release ballast water spilled during dry dockage

Table E-3a. Spills to the Lower Willamette River from DEQ's Spill Information Network.

YR	OERS Site Name	Address	City	Date	Description
95	2032 DARIGOLD SHORT LEAK WHILE REPAIRING VALVE	2720 SE 6TH	PORTLAND	12OCT1995	
95	2069 CASCADE GENERAL HYDRAULIC LINE BROKE ON SHIP	5555 N CHANNEL	PORTLAND	17OCT1995	
95	2061 FOSS MARITIME LOADING ONTO BARGE OBSERVED LEAKING THROUGH 3" CRACK	2900 NW ST HELENS RD	PORTLAND	18OCT1995	
95	2127 MARSHALL HIGH SCHOOL ACCIDENTAL SPILL OF FORMALDEHYDE	SE PORTLAND	PORTLAND	25OCT1995	
95	2124 CASCADE GENERAL SHEEN ON RIVER		PORTLAND	25OCT1995	
95	2158 USCG SHEEN ON RIVER	12005 N BURGARD	PORTLAND	30OCT1995	
95	2178 ANHEUSER-BUSCH AMMONIA RELEASE	5810 N. CUTTER RD	PORTLAND	01NOV1995	
95	2221 CHRISTENSEN OIL TRUCK ROLLED BACKWARD WHILE BEING FILLED & THE OIL RAN INTO RAINWATER & SPREAD	3821 NW ST HELENS RD	PORTLAND	06NOV1995	
95	2242 PORT DELIVERY CURB BROKE CROSS-OVER LINE WHILE DRIVER WAS BACKING UP	PO BOX 17069	PORTLAND	08NOV1995	
95	2241 FUTURE MOTOR FREIGHT TRUCK HIGHCENTERED & BROKE CROSSOVER LINE	3150 NW 35TH	PORTLAND	08NOV1995	
95	2271 GATX TERMINALS PAST LEAKAGE HAVE RESULTED IN SHEEN ON RIVER	11400 NW ST HELENS RD	PORTLAND	11NOV1995	
95	2315 HOMEOWNER DROPPED & BROKE A BOTTLE OF PESTICIDE IN DRIVEWAY	3026 NE HOYT	PORTLAND	14NOV1995	
95	2411 UNION PACIFIC R.R. TRAIN ENGINE HIT TRAILER CHASSIS & TORE AN EXTERIOR MOUNTED CRANKCASE LINE	2745 N INTERSTATE AVE	PORTLAND	28NOV1995	
95	2454 HEUKER PROPERTY APPEARS TO BE FROM ABANDONED HEATING OIL UST	7400 SW MACADAM	PORTLAND	01DEC1995	
95	2444 MOORE'S CUSTOM CLEANERS	3 MONROE PARKWAY	LAKE OSWEGO	02DEC1995	

Table E-3a. Spills to the Lower Willamette River from DEQ's Spill Information Network.

YR	OERS Site Name	Address	City	Date	Description
	TANK OVERFLOW				
95	2450 UNOCAL FUEL LINE LEAK	14003 N RIVERGATE BLVD	PORTLAND	04DEC1995	
95	2549 VIKING FREIGHT LEAK FROM TRAILER	9010 NE 13TH	PORTLAND	07DEC1995	
95	6276 PGE STORM DOWNED POWER POLE	SW 37TH & PAMONA ST	PORTLAND	12DEC1995	
95	2646 CITY OF WEST LINN POWER OUTAGE CAUSED OVERFLOW	19030 NIXON AVE	WEST LINN	13DEC1995	
95	2662 PGE STORM DOWNED POWER POLE	644 CABANA LANE	LAKE OSWEGO	14DEC1995	
95	2712 ARCO OILY SHEEN ALONG SEAWALL	9930 NW ST HELENS RD	PORTLAND	18DEC1995	
95	2772 ELF ATOCHEM CHLORINE LEAK	6400 NW FRONT	PORTLAND	28DEC1995	
96	99 SCHNITZER STEEL DOCK DATE & TIME OF RELEASE UNKNOWN	12005 N BURGARD	PORTLAND	10JAN1996	
96	104 PORTLAND HAZ MAT SPILL OF FLAMMABLE LIQUID	5700 NW FRONT	PORTLAND	11JAN1996	
96	163 ROADWAY EXPRESS BROKEN DRIVE SHAFT DAMAGED FUEL LINE -	6845 N CUTTER CIRCLE DRAINED SADDLE TANKS	PORTLAND	18JAN1996	
96	166 VALVOLINE SPILL OF OIL WHILE LOADING CONTAINER -	2308 N CLARK ST BUCKET FELL & TOP CAME OFF	Portland	19JAN1996	
96	222 FOSS MARITIME .5 GALLON BILGE OIL INTO WILLAMETTE	9030 NW ST HELENS RD	PORTLAND	24JAN1996	
96	338 DERRICK BARGE NONE GIVEN	TERMINAL 2	PORTLAND	05FEB1996	
96	442 BLUE FLAME OIL HOLE N DELEVERY HOSE CAUSED RELEASE OF DIESEL PRIOR TO REFUELING OF AMTRACK TRAIN	9830 SE POWELL	PORTLAND	05FEB1996	

Table E-3a. Spills to the Lower Willamette River from DEQ's Spill Information Network.

YR	OERS Site Name	Address	City	Date	Description
96	405 BOAT OWNER BOAT SANK DURING REPAIRS DUE TO FLOOD	11919 N JANTZEN DRIVE	PORTLAND	07FEB1996	
96	529 TEXACO FLOOD RELATED	3800 NW ST HELENS RD	PORTLAND	08FEB1996	
96	766 FUEL PROCESSORS FLOOD RELATED	4150 N SUTTLE RD	PORTLAND	09FEB1996	
96	-936 RESIDENT FLOOD RELATED	5855 SW LOMBARD	PORTLAND	15FEB1996	
96	1368 CITY OF PORTLAND BROKEN SEWER LINE	2933 PERIANDER	PORTLAND	22FEB1996	
96	1140 ELF ATOCHEM OVERFLOW OF PROCESS TANK AT CHEMICAL PLANT	6400 NW FRONT	PORTLAND	23FEB1996	
96	1343 CASCADE COLUMBIA WHILE UNLOADING A BARREL A SPILL OF MURATIC ACID OCCURED	2637 SE 12TH	PORTLAND	19MAR1996	
96	1401 FOSS MARITIME DIESEL OIL TO RIVER FROM SHIP ANSAC ASIA	NOT GIVEN	PORTLAND	27MAR1996	
96	1403 FOSS MARITIME DIESEL FUEL SPILLED ONTO WORK DECK & FUELING DOCK	9030 NW ST HELENS RD	PORTLAND	28MAR1996	
96	1488 CASCADE GENERAL NONE GIVEN	5555 N CHANNEL AVE	PORTLAND	09APR1996	
96	1485 CROWLEY MARITIME NONE GIVEN	MCCALL OIL REFUELING DOCK	PORTLAND	09APR1996	
96	1502 ARCHITECTURAL ENG. SUPPLY A BOTTLE WAS DROPPED DURING TRANSFER	1741 SE 10TH AVE	PORTLAND	11APR1996	
96	1504 ADM MILLING CYLINDER - FAULTY VALVE	1362 NW FRONT	PORTLAND	11APR1996	
96	1515 U.S.C.G. BOAT SINKING CAUSED SHEEN ON WATER	PIER 2 TERM 4	PORTLAND	14APR1996	
96	2014 Swan Island Lagoon Sheen on Willamette River, Swan Island Lagoon		Portland	25JUN1996	

Table E-3a. Spills to the Lower Willamette River from DEQ's Spill Information Network.

YR	OERS Site Name	Address	City	Date	Description
96	2102 Swan Island	5555 N. Channel	Portland	08JUL1996	While changing the ships ballast (Green Harbour) oil leaked out along the stern tube. USCG investigated and approved cleanup.
96	2150 Willamette Park Boat Docks		West Linn	14JUL1996	VW bug in Willamette River at Willamette Park Boat Docks. Eugene block oil released. 30-40 foot sheen x 10 feet wide.
96	2393 Lagoon	N. Channel	Portland	14AUG1996	A substance that appears to be glue is coming out of a storm drain, is entering the lagoon at Cascade General/USCG area of the Swan Island Lagoon.
96	2402 UP Railroad line failure	2745 N. Interstate	Portland	15AUG1996	
96	2633 Staff Jennings	Sellwood bridge west	Portland	15SEP1996	Rain water flushed a small amount of diesel from a fuel storage area and across a new asphalt. The oil and melted pavement caused a sheen in the Willamette River.
96	2706 Barbie Trucking	Yeon Ave @ NW Nicolai Street	Portland	16SEP1996	Truck hit a brake drum in the ramp of I-405 from freemont bridge. It cut the fuel tank cross over and released diesel. Fuel flowed down ramp and into storm drain.
96	2634 Cascade General	301 Cascade General	Portland	16SEP1996	Unknown volume fuel/oil sheen
96	2816 Port of Portland	7201 N Marine	Portland	02OCT1996	A line broke on a loader and Hyd fluid spilled onto parking lot
96	2852 USCG	6767 N Basin Ave	Portland	08OCT1996	refueling a work boat from shoreside. Surge suppressor failed. No cleanup. Product dissipated.
96	3002 UPRR	12th & Clinton	Portland	30OCT1996	Transfer from lake yard (westside) to Brooklyn yard (S.E.) Hopper door popped open.
96	3096	12005 N Burgard Rd	Portland	14NOV1996	Ma Quan Hat (Korean vessel) suspect source
96	3102 Oak Grove Boat Dock	800 SE Oak Grove Blvd	Milwaukie	15NOV1996	
96	3279 St Johns Bridge	8010 NW St. Helens Rd.	Portland	24NOV1996	Oil slick of Black Fuel Oil
96	3400	10415 SW Radcliff Ct.	Portland	06DEC1996	

Table E-3a. Spills to the Lower Willamette River from DEQ's Spill Information Network.

YR	OERS Site Name	Address	City	Date	Description
					Pink oily substance entering unnamed neighborhood creek. Source believed to be heating oil UST at unoccupied house. Overflow due to rain.
96	3524 McCall Oil & Chemical Terminal	5480 NW Front	Portland	13DEC1996	Sause Brothers Tug Titan/bunkering incident, overflow of deck sounding plug.
97	2198 Pacific Detrail Diesel	Basin Ave	Portland	28AUG1997	Black waste oil spill from unknown source coming from outfall. 25 gallons.
97	2213 Hall-Buck Marine	15550 N. Lombard	Portland	30AUG1997	Mechanical failure of head shut loading urea into ship approx 100-150 lbs into river.
97	2271 In front of Chevron facility	5924 Front St.	Portland	08SEP1997	Unknown blue substance pooling on the river. No petroleum odor. Wind blowing substance upstream. Unocal/TOSCO also reported. USCG enroute. CG unable to detect substance. May want to check under the docks in the morning. Russian vessl
97	2352 West Linn Paper Co.	4800 Mill Street	WestLinn	17SEP1997	5' X 200' slick at a dark oily substance. within the lock at Willamette Locks. Dissipating. Still investigating the source. Storm flushing an old hog fuel pile- dark water ran into locks.
97	2353 PGE Poyer Pole	N. Buchanan and N. Lombard	Portland	17SEP1997	MVA- car crash into power pole. Non PCB transformer oil spilled of pavement.
97	2378 Foss Maritime	9030 NW Street St. Helens Rd.	Portland	22SEP1997	100 yards X 100 Feet silver sheen
97	2415 Cascade General		Portland	27SEP1997	Mva Cascade General in Portland, 50 gallons Diesel. 20 yards in storm drain
97	2458 ELF Atochem	6400 NW Front	Portland	02OCT1997	hlorine gas release to atmosphere, small but unknown quantity from break in loading hose. One person injured- treated for burns then transported to Emanuel. Source stopped, gas dissapated, no remaining cloud.
97	2489 Foss Maritime	9030 NW St. Helens Rd	Portland	07OCT1997	300-400' long X 150' wide sheen from outfall
97	2543 Foss Maritime- Tug-Jim Moore	River Mile 5.5	Portland	14OCT1997	Sheen near St. John's Bridge/came from downstream of Foss-washed upstream due to tide.
97	2553 USCG	8970 N. Bradford	Portland	15OCT1997	50 gallons oil/water mix from bilge on lifeboat. Lifeboat damaged on 14 Oct, 1997 as it was being lowered during test. Very little oil (sheen) in contained/boomed area- release was expected.

Table E-3a. Spills to the Lower Willamette River from DEQ's Spill Information Network.

YR	OERS Site Name	Address	City	Date	Description
97	2559 Gatex	11400 NW St. Helens Rd	Linnton	16OCT1997	Valve crack at terminal. 1/2 gallon into river. Evaporated
97	2597 US Army Corp of Engineers	8010 NW St. Helens	Portland	22OCT1997	Sheen coming from underground source, bubbling up from sediments possibly due to disturbance by vessel prop wash and core sampling done
97	2625 McCracken Trucking	3147 NW Front	Portland	25OCT1997	Very small substance of yellow substance- possibly not haz, to storm drain. Probably washing operation during afternoon. Material spilled in semi-trailer, RP flushed it to storm drain.
97	2640	12005 N. Burgard	Portland	28OCT1997	75' square sheen/near vessel star dover, came from a private outfall
97	2704	1130 NE 28th	Portland	05NOV1997	Drug lab at storage lockers
97	2705 DEA	6936 NE Grand Apt 30	Portland	05NOV1997	DEA Requested ORP # for drug lab ORP936003446
97	2767 Cascade General	55 N. Channel	Portland	13NOV1997	A line broke during pressure testing, 50-100 gallons of oil went into the water.
97	2828 ODOT	I-5 southbound, Cook Street	Portland	21NOV1997	Acid in a milk jug along shoulder of freeway. Hazmat 6 is responding. Metro will dispose of it.
97	2921 USCG	East end Morrison Bridge	Portland	01DEC1997	1 acre sheen on river at east end of Morrison Bridge.
97	2951 Steinfelds Products	10001 N Rivergate	Portland	04DEC1997	400 gallons of diesel heating oil. Affected storm drain/surface water also. 100 gallons in the river. New AST installed. While applying air to prime the system, fuel was released from the pressure relief valve.
97	3074 Tosco Plant	5528 NW Doane	Portland	19DEC1997	2000 gallons of lube oil released to concrete containment around tank. Some soil areas in containment removed. Recovered 1800 gallons so far CET to steam clean tomorrow. Uniglide is product, saw glide oil- medium viscosity (50wf)
97	3098 Cascade General Facility	5555 N Channel	Portland	23DEC1997	25-50 gallons diesel through the parking lot. Appears to be vandalism. Puddles on the pavement but no impacts to the river or water. They are using sand/sorbent to clean up. They are working with police to find the perpetrator.
97	3100 Oregon Steel	14400 N Rivergate Blvd.	Portland	24DEC1997	

Table E-3a. Spills to the Lower Willamette River from DEQ's Spill Information Network.

YR	OERS Site Name	Address	City	Date	Description
					Hydraulic system failure- synthetic hydraulic fluid spilled from equipment room for mold conveyor system. Initially thought to be contaminated. Some of the 40-70 gallons spilled and entered a catch basin and the River.
97	3215 Freeway Land Company	6400 SE 101st	Portland	29DEC1997	Owner of property reports that an unknown truck broke a hydraulic line in their parking lot spilling less than 42 gallons of oil to a gravel and dirt parking lot. Spill and clean-up happened two days before on Monday.
98	3 USCG	below Sellwood Bridge	Portland	02JAN1998	Small sheen on Willamette river S Sellwood Bridge. USCG says it is dispating. They will not look or respond. PO Wolf
98	7 USCG	Sellwood Bridge	Portland	03JAN1998	50 yards by 10 feet rainbow sheen on Willamette River. Coast Guard let the sheen dissipate. Not recoverable.
98	67 Foss Maritime	9030 St Helens Rd	Portland	12JAN1998	Oil/water separator disconnected- caused small sheen was on board barge. 1-5 gallons
98	75 Foss Maritime	9030 NW St. Helens Road	Portland	12JAN1998	Bilge pump problem. ~25 gallons spilled into the Willamette River. Pump shut off after 15-20 sec. Product contained in slip area. Boom and pads applied. Foss Environmental enroute. NRC #419463
98	111 Market Transport	3182 NW 26th	Portland	14JAN1998	50 gallons from ruptured
98	156 Savage Industries	near 4098 N. Port Center Way	Portland	20JAN1998	Clay/water mixture coming from outfall.
98	182 Fritz Maritime	1650 NW Front Ave Suite 150	Portland	22JAN1998	2oz from broken hose on vessel (hydraulic line on ships crane) Already dissipated- 2oz hit the river/rest on deck <1 pint.
98	223 Vessel JA Rainbow	1650 NW Front Ave	Portland	28JAN1998	Vessel JA Rainbow has a hydraulic leak into the river. A line burst on the rope tightener, spilling hydraulic oil onto the deck. 600 liters, 160 gallons total. 15-20 gallons into the water.
98	277 Citizen	I-5 MP 299 1 block south of spaghetti fa	Portland	03FEB1998	MVA multi-vehicle accident/saddle tanks (possible source?) ODOT storm drain system-outfill. Oil coming from outfill-boomed by hazmat
98	321 M/V Airston	1800 SW 1st	Portland	09FEB1998	Cargo vessel "Airston" leaking hydraulic oil from rudder post due to a lubracation fitting-sheen dispersed-no cleanup possible.
98	337 Cargill	800 N. River Street	Portland	12FEB1998	1/2 gallon hydraulic fluid-from drilling
98	346 USCG	River mile 15	Portland	12FEB1998	

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YR	OERS Site Name	Address	City	Date	Description

	USCG-PO McFadden-240-9301, On scene Larry Agnew 241-4962, Representing Portland Spirit, reports sheen on Willamette river mile 15 @ Salmon Street Springs. No source or spill found by fire or USCG.				
98	389 Portland Fire	Foot of SW Gains	Portland	17FEB1998	Portland fire notified they used 1 gallon class A foam on a fire. Run off to the Willamette River. No fish killed. Coast Guard aware of release.
98	454 Schnitzer Steel	1200 s Burgard Rd	Portland	27FEB1998	100 X 100 ft sheen on Willamette River near slip @ terminal 4 near outfall at slough. Snitzer steel has barges in the area.
98	529 USCG	1300 NW Front	Portland	10MAR1998	vehicle found in river. (body found inside) Leaking unrecoverable fuel and oil.
98	844	Near Morrison Bridge	Portland	10APR1998	Petroleum release to Willamette River, Portland Fire reports slight sheen.
98	2645 Helser Bros. Transfer Co.	7025 N Leaddetter	Portland	11APR1998	5-10 gal spill-Nozzle fell out of tank during refueling/ rain moved it rapidly to catch basin (oil/water) separator and also a storm drain and stormwater retention pond (100' X 50')
98	870 Chevron Asphalt	5551 NW Front	Portland	15APR1998	9100 gallons gasoline on a tanker truck. Truck hit a parked trailer next to the street and rolled over next to the asphalt loading rack and caught fire. Almost all gas burned, and about 10 gallons of fuel was captured from the storm drain
98	878 Outfall	3600 NW Front	Portland	15APR1998	Heavy green algae-like material in flow-not floating. 1/4" acre area of lagoon impacted-along south edge of lagoon for about 200 yards. Appears to be pollen or organic. No problem visible next morning.
98	1032 Cascade General	Swan Island	Portland	03MAY1998	Security guard at Cascade reported seeing guts and grease coming out of the storm drain at Linden farm chicken processor.
98	1044 USCG		Portland	04MAY1998	Oil sheen around Evirmedon vessel at Columbia Grain. M/V Evirmedon- came from gullast tank-small leak in pipe running through tank
98	1551 Portland Fire	7720 SW MacAdam	Portland	29JUN1998	Flourescent dye in creek. Probably dye test. Tide heading in creek; will turn soon
98	1662 FRITZ MARITIME - AGENT	TERMINAL 5	Portland	13JUL1998	5 GAL BUCKET OF ACRYLIC WATER-BASED PAINT FELL FROM CARGO VESSEL - M/V WESTERN OPAL
98	2288	3821 NW St Helens Rd	Portland	25SEP1998	200 gal chainsaw oil spilled onto dirt Containment area

Table E-3a. Spills to the Lower Willamette River from DEQ's Spill Information Network.

YR	OERS Site Name	Address	City	Date	Description
98	2319 Schnitzer Steel dock		Portland	30SEP1998	Vessel Juneau, 3' X 70' sheen near vessel
98	2359 GATX Docks	11400 NW St Helens Rd	Portland	03OCT1998	Tri-City Voyager (Barge), Dockline broke-200 gal Willamette, Portland Fire Boat notified/ Foss Maritime hired by RP, Coast Guard- 803-240-9301-Responded-dissapating well Greg Lies- with GATX
98	2365		Portland	04OCT1998	Coast Guard Auxillary reports white 55 gal drum on bank-about 20' up Auxillary reports does not appear to be leaking-Milwalkie Fire will not respond W/O address. (Tina-Milwaulkie PD Dispatch- 503-659-2345)
98	2418	T-2 Berth 204- 3556 NW Front	Portland	09OCT1998	Vessel "pac King" leahing hydraulic oil from broken pipe/hose on hatch cover system. On water response initiated. Estimated 2 gal spilled, withb < 1 gal into river. Only sheen on water-rapidly dissopated.
98	2419 NASELO property	6340 SW Macadam	Portland	09OCT1998	2 gal paint pigment- some into river.- Additional Hax Waste issues.
98	2439	5528 NW Doane - on the Willamette River	Portland	11OCT1998	NRC Incident # 459405- Anonymous caller reported a sheen on the Willamette-15' X unknown length.
98	2461	Willamette River near OMSI	Portland	12OCT1998	Sheen on the Willamette River-Approximately 50' X 200'-Dissipating. Non-recoverable and no source found.
98	2471 McCall Oil & Chemical	5480 NW Front	Portland	13OCT1998	< 2 gal (Unrecoverable-Formed 75 X 20' Sheen) - Seporutor backed up due to absorbent pillows being washed around by rain-other seporutor had flow-through of site water W/oil
98	2484 Schnitzer Steel	12005 N. Burguard	Portland	13OCT1998	Unrecoverable 100 yd X 2' wide sheen along log burrer USCG indicate, No clear evidence of source.
98	2500 McCall Oil Co	5480 NW Front	Portland	16OCT1998	USCG reported 250' by 1/4 mile long light sheen near McCall Oil Dock. NO SOURCE FOUND-Unrecoverable
98	2507 Pacific Northern Oil	7900 NW St.Helens	Portland	17OCT1998	MV Chesapeake, Blew fuel fill line wo/emptying the hose. Sprayed oil on dock and deck, some fell into river.
98	2525 Cascade General	5555 N. Channel Ave, berth 312	Portland	20OCT1998	25 gal from rented mobile generator- 5 gal reached river-creating 900' X 40' SHEEN- user discovered unplugged line on fuel tank- not certain of purpose but it atlowed release when tank was filled
98	2586	2600 N River St	Portland	27OCT1998	White milky substance w/algae from storm drain to Willamette River at 2600 N. River St. in Portland, Or. (near Albina rr yard & Goldendale Alumaium Plant- USCG called OERS at 1800 & investigated at 18:26 on 10-27-98- No cleanup possible- e

Table E-3a. Spills to the Lower Willamette River from DEQ's Spill Information Network.

YR	OERS Site Name	Address	City	Date	Description
98	2590	?	Portland	28OCT1998	Clam shell dredging causing sheen on river (believe it is from Creosote)
98	2637 Tosco Dock	5528 NW Doane	Portland	03NOV1998	121' vessel "Pacific Falcon" - Overfill during refueling - 1Gallon into river
98	2652	I-405 at Glisan St	Portland	06NOV1998	I-405 at Glison street, Tractor Trailer rollover released 7,000 gallons of liquid asphalt. Significant amount into storm drain.
98	2681	N Basin Ave	Portland	09NOV1998	Sheen on river-From outfall- U.S.C.G. determined it to be unrecoverable.
98	2693	Ensign Ave	Portland	10NOV1998	Oil coming from outfall-BES boomed it & looking for source outfall # m1
98	2747	I-5 N @ Morrison Bridge on-ramp	Portland	18NOV1998	Semi jackknifed on I-5 northbound north of Morrison Bridge at on ramp. Approximately 75 gallons of diesel released to asphalt. Unknown amount to Willamette River Via storm drains.
98	3005	110 SE 2nd	Portland	07DEC1998	50 gallons of diesel spilled into storm drain
98	3059	15550 North Lombard	Portland	12DEC1998	2 tons potash in Willamette. Now dissipated.
98	3103	Willamette River	Portland	18DEC1998	Don was on the river and found a tank floating, leaking diesel fuel. USCG hired Foss to recover the tank and conduct cleanup.
98	3119 Wacker Siltronix	7200 Front Ave.	Portland	20DEC1998	Wacker Siltronic- Release From roof unit. Released "grow Pro"- KOH,MOLYBDATE,TOYTOBAZOLE-Fan broke- 250 gal solution 8-8.5 ph
98	3141	Willamette River below Sellwood Bridge	Portland	23DEC1998	A drum in the Willamette leaking oil was observed below the Sellwood Bridge. Sheen also reported in the area. Fire boat could not locate the drum. Will wait for some other information- per USCG.
98	3147 TOSCO Bulk Plant	5528 NW Doane	Portland	24DEC1998	Abandoned line charged with water ruptured from freezing and released water and 5 gallons gasoline to the Willamette. They placed booms but will release on USCG recommendation.
98	3230	I-5 SB just before Broadway Bridge Exit	Portland	31DEC1998	Tanker Truck was forced to break heavily causing Diesel fuel to splash out of tank onto pavement- Lost 50 gallons.No water impacts.

Table E-3a. Spills to the Lower Willamette River from DEQ's Spill Information Network.

YR	OERS Site Name	Address	City	Date	Description
99	45 Lone Star Sand & Graver	5400 Front Street	Portland	08JAN1999	Worker dropped a bucket containing 1.5 gallons of oil into the Willamette River, then tried to catch it with the same bucket.
99	78 drum in river		Portland	12JAN1999	U.S.C.G. picked up Drums in river- 2 Drums pesticides needed ORP# for disposal. ORP936003604
99	79 Trashco Service Inc.	1630 SE 8th	Portland	13JAN1999	Spilled 20 plus gal diesel while siphoning washed it to storm drain-also cleaned out wasre oil catch pan (spillage pan?) at some time.
99	176 Precision Equipment	8440 N Kerby Ave.	Portland	20JAN1999	Hole in liner in roll off box allowed chromium in water to escape, from chromic acid vointion/salts from plating process (D007 waste), material with rain water and flowed to storm drain.
99	171 Willbridge Terminal	Front & St. Helens Rd.	Portland	21JAN1999	Worker doing construction at BN Railway yard noticed heavy odors and diesel contamination near "moontrack" at Willbridge.
99	201 Foss Maritime	9030 NW St. Helens Rd.	Portland	23JAN1999	Tug (Sora Brix) produced small sheen at her mooring after start up. Sheen stopped shortly after. Tug had not been started in some time likely a shaft ally/stuffing box release. Vessel 69'X19' 1500 hp twin screw 1949 vintage.
99	206 UST leak	2905 NE 54th St.	Portland	23JAN1999	Citizen damaged UST fill spout causing water infiltcation and causing fuel to float out. Portland Haz Mat and BES responded & will handle.
99	256 Cascade General	5555 N. Channel Ave.	Portland	29JAN1999	5 gallons of Hydraulic oil spilled on to Dry Dock and on to water.
99	257 MVA	143 & NE Sandy	Portland	29JAN1999	Train VS Semi causing diesel fuel spill from the truck- Fire & Explosion resulted.
99	261 Freightliner	6936 Fathom	Portland	29JAN1999	200 batteries, dumping sulfuric acid= 10 gallons into storm water and to storm drains
99	264	Willamette River mile 7	Portland	30JAN1999	One 55 gal Drum in Willamette River (blue poly drum) contents unknown (maybe empty) was in mid-channel U.S.C.G. did not do any recovery.
99	376	7th Taylor SW	Portland	04FEB1999	Hydraulic line on cement Truck broke, 25 gal to asphult- rain may have washed some to storm drain
99	373 Tosco Fuel Dock	5528 NW Duane	Portland	10FEB1999	Tug Boat lost 2-3 gal diesel- prior to refueling- came from hose Tidewater Tug "Definanic"- Tug crew unhooked line under pressure.
99	396 MVA	5900 SW McAdam	Portland	13FEB1999	

Table E-3a. Spills to the Lower Willamette River from DEQ's Spill Information Network.

YR	OERS Site Name	Address	City	Date	Description
					Hydraulic line failure on garbage Truck- 3 gal of hydraulic oil spilled onto pavement- Tracked all over street by vehicles- absorbent used on pavement & oil- absorbent sock used at adjacent storm drain by garbage hauler- City will notifyUSC
99	517 none	52nd & Henderson	Portland	23FEB1999	Portland Haz Mat On-scene with 40-50 Quart containers of Chemicals on Street. Known drug area- Sgt. Larson responds & confirms- Drug Lab
99	519 McCall Oil	5480 NW Front	Portland	24FEB1999	McCall Oil noticed Sheen on Willamette River U.S.C.G. and Portland Fire respond by boat-Oil 30'X50' light Sheen Unrecoverable
99	530 Air Mark	1848 NW 23rd	Portland	24FEB1999	100 gallons overfill to asphalt & storm drain/catch basin about 20 gallons got to storm drain that discharges to City of Portland
99	696 Swan Island Area		Portland	10MAR1999	Oil Sheen near Fred Divine outfall(outfall one mile) 400'X 1,000'- Unrecoverable
99	790 T-5/Columbia Grain Elevator	15660 N. Lombard	Portland	22MAR1999	155 m Vessel "Alam Gula" doved- Testing Fire Pump- Faulty valve sprayed oil into river(1/2 qt)- unrecoverable SHEEN.
99	1047 Providence Beginning Center	447 NE 47th St	Portland	27APR1999	Chipping paint from older bldg, poss lead content, no cleanup or containment of chips (to 1"). Some washing to stormdrain with rain. Ptld BES to respond to site with sweeper. DEQ/NWR/HW DO notified.
99	2526	5528 NW Doane Ave	Portland	02NOV1999	1/2 gallon diesel spilled during refueling, Tug "Howard Olsen"
99	2566	I-5 MP 296.5 NB	Portland	08NOV1999	Semi jackknifed, 40 gal spilled (20 in storm drain). RP was very responsive and helpful according to cleanup crew.
99	2599 none	I405 SB	Portland	12NOV1999	Semi in accident lost 20-30 gallons diesel into a drain.
99	2649		Portland	17NOV1999	10 gal oil at construction site - being applied to concrete forms (incidental spillage) - complainant unwilling to go forward with this until he has found other employment - spill is close to river
99	2667 McCall Oil Chemical	5480 NW Front Ave	Portland	19NOV1999	80 gal bunker from rail car on side of rail car and ground. Heating asphalt in tank overflowed top.
99	2694	I-405 NB @ Burnside Bridge	Portland	24NOV1999	Deisel spilled - 30 gallons - during truck and several car MVA. Caught some in storm drain inlet, boom being placed in outfall.
99	2854 Tosco Dock	5528 Doane Ave	Portland	11DEC1999	Fueling a tug at the dock. The Foss "Howard Olson" overfilled tank.

Table E-3a. Spills to the Lower Willamette River from DEQ's Spill Information Network.

YR	OERS Site Name	Address	City	Date	Description
99	2936 Cascade General	5555 N Channel Ave	Portland	21DEC1999	sheen observed under pier
99	2950 Cascade General Ship Repair	5555 N Channel	Portland	23DEC1999	~2 gal bunker fuel and diesel spilled to Swan Island Lagoon within a preboomed area. While cleaning a barge they found hose was still under pressure and fuel was released onto deck and water. Cleaned with pads.
0	47 USCG		Portland	05JAN2000	USCG MSO PDX informing OERS of abandoned drum on the Will. River on the west bank, south side of Freemont Br.. The drum is not leaking. OERS notified Fire Boat and BES. No request for help from either
0	139 unknown	unknown	Portland	13JAN2000	Thick black liquid being discharged from pipe beneath surace of water, does not mix with water, 5 diameter SD, at least 5 days on/off, wasn't today, Thunderbird Way and cosby, 1" intersection then lato road Tp river then oft rpd of ship.
0	244 USCG	300N River	Portland	27JAN2000	Sheen 1/8 mile long - unrecoverable/light - no discernable source
0	297 Oregon Steel Mill	14400 Rivergate Blvd	Portland	05FEB2000	1-2 gallon Hydraulic fluid to storm drain then to river, Cleaned up/boomed out fall, hydraulic line on mold ruptured (steel mold) fluid leaked through seam where floor meets walls and went to storm drain.
0	320	9030 NW St Helens Road	Portland	07FEB2000	Burp is sounding tube on tug. Lewiston tug. Boomed, pads applied.
0	354 Columbia Grain Elevator	15998 N Lombard	Portland	12FEB2000	Yong An 11, Pumping bilges and valge got stuck open. Bunker oil.
0	1104 Consolidate Metco	13940 N Rivergate	Portland	19FEB2000	200 gallons of water soluble oil spilled to the pavement. 70 gallons to the storm drain. 130 gallons captured as liquid. 6-7 oil. Recovering liquid from storm drain and measuring outfall. Portable tank not secured and fell off fork lift.
0	431 Port of Portland Berth #603	vessel name = Fanal Merchant	Portland	22FEB2000	10 gal loading equipment leaking inside freight container - improperly stored. Leaked oily substance - assumed to be hydraulic fluid. Not shipping company's fault, USCG pursuing enforcement of cosigner (packager) due to improper loading
0	437 none		Portland	23FEB2000	10 gal spilled during generator testing ~1 gal reached river new generator's on new barge - injector plug had a leak - sheen noticed next morning - delay in reporting - had to track down accurance of spill trthrough maintenance records
0	550 Larsons Automotive	1727 SE 11th	Portland	12MAR2000	200 gals of caustic, oil & sludge released from caustic dip tank in shop. Ran out of shop & fire diked to contain. BES & PDX Fire advised RP to call CU contractor. Leak was caused by tank & valve failure. Shop was unattended weekend leak.

Table E-3a. Spills to the Lower Willamette River from DEQ's Spill Information Network.

YR	OERS Site Name	Address	City	Date	Description
0	579 USA COE	8010 NW St. Helens Road	Portland	16MAR2000	heavy oil being blown up river by wind - unknown source - very small amount - subsequently USA COE determined one of their staff had spilled oil (tiny bit) while carrying a drain pan over a dock - will submit report
0	601 tug "John Brix"	McCall Oil Dock	Portland	19MAR2000	fuel tank of tug "John Brix" burped while refueling at McCall Oil Dock in Portland Harbor - most of oil contained on deck - 1-2 gallons in water
0	612 Portland Shipyard	5555 N. Channel Avenue	Portland	21MAR2000	fueling power barge - check ball valve failed with release of ~ 5 gal diesel into river - no drinking water intakes impacted
0	724		Portland	04APR2000	River patrol - USCG auxiliary - spotted 12 drums along high water mark - see OERS 00-762
0	741 Cascade General	5555 N. Channel Ave.	Portland	05APR2000	.5 gal to water
0	749	0315 SW Montgomery	Portland	05APR2000	Citizen reporting gasoline odor and sheen at Riverplace Marina. - determined to be diesel
0	755 Terminal 4		Portland	06APR2000	Hydraulic cylinder blew <1 liter into water "Century Leader 3" car carrier vessel
0	762 Sauvie Island		Portland	07APR2000	12 barrels - look like they've been there a long time - 3 water, 1 tar, rest empty - see OERS 00-724
0	770 Portland Shipyard	5555 N. Channel Ave.	Portland	09APR2000	Vessel "Chevron Colorado" released hydraulic oil during maintenance work at berth 302 Swan Island ship yard.
0	807 Willamette River		Portland	13APR2000	Sheen observed on Willamette - appears to have come from storm drain
0	961 none	6458 N Basin	Portland	02MAY2000	MVA with 80 gallons of diesel going to a storm drain - semi leaking. Drain is 500 - 1000 yards from the river. Fire boat on scene - product not yet visible on river. BES enroute. USCG contacted
0	1008 Scititzer Steel Dock	120005 N Burggard Road	Portland	09MAY2000	Barge fuel valve left open.
0	1055	5655 Chanel Street	Portland	14MAY2000	Polar spirit, 11,000 ft. tanker in layup residential oil is sea chest. Partside bubbles of crude on large leak. Coast Guard, PDX Fire called by OERS will also call ODFW Clean Rivers and ship boomed

Table E-3a. Spills to the Lower Willamette River from DEQ's Spill Information Network.

YR	OERS Site Name	Address	City	Date	Description
0	1086	River above the Falls	West Linn	17MAY2000	Large sheen at West Linn, possible gasoline very thin and no odor.
0	1147 Cascade General	5555 N Channel Ave	Portland	22MAY2000	3 gallon fuel can of diesel got knocked over, was not on contained (oil/water separator) area of dock.
0	1175 none	Ross Island Lagoon	Portland	26MAY2000	Hydraulic line burst on dredge relasing 6 gal. at Hogate slough, Foss to cleanup.
0	1187 OR Steel Mills	1400 Rivergate	Portland	27MAY2000	All Pump looking for authorization to pump/transport sewage fro OR Steel Mills septic tank. Cascade Phillips on scene already pumping/request denied. DEQ managers need to discuss this. Authorization not within job scope of duty officer.
0	2187 Chevron	5531 NW Doane Road	Portland	01JUN2000	Underground pipe at bulk facility failed - 3,260 gallons of fuel addiive released to subsurface.
0	1284		Portland	06JUN2000	Drydock just d/s oil St. Johns Bridge in PDX Harbor. Lanolite is enviornmentally friendly substance. accidentally discharged into Will. River, when on water 50x100' booms & absorbent pads used to contain & clean up spill.
0	1304 Tanker Pacific Management	Swan Island	Portland	09JUN2000	NRC#531537, Alaska Jewl/Cascade Gen. Ship yrd./PEXT28942, Cowlitz Clean Sweep enroute. Testing fire pump, foam is mixed with Hydrolic oil/discharge on deck & over the side.
0	1339 Tosco	5528 NW Doane	Portland	14JUN2000	Light sheen on river, unknown source, quickly dissipated.
0	1356 Cascade General			15JUN2000	1 gal leaked from overpressurized stern tube seal (propellor) MSC Paul Buck a US merchant Marine marine Tanker.
0	1479	5480 NW Front Avenue	Portland	29JUN2000	overflow during refueling of tug Jesse caused 2 gallon diesel spill - 1 gallon reached river.
0	1612	Holgate Slough	Portland	13JUL2000	sheen observed on water - unknown source
0	1679	Front Street	Portland	19JUL2000	unrecoverable (per USCG) sheen observed downstream of outfall under old Albers Mill by Broadway Bridge/Front Street. Portland BES to investigate
0	1724 Tosco Outfall #22	Nw Front/Doane	Portland	25JUL2000	petroleum groundwater contamination entering storm sewer through joints in pipe
0	1755 Near Tosco	near 5528 NW Doane	Portland	28JUL2000	

Table E-3a. Spills to the Lower Willamette River from DEQ's Spill Information Network.

YR	OERS Site Name	Address	City	Date	Description
					200 sq. ft. patch of milky substance with brown spots collecting near dock and vessel - unknown source - dissipated rapidly.
0 1959		Riverplace Marina	Portland	19AUG2000	unconfirmed mystery sheen from unknown source - reported by anonymous caller
0 2185	Tosco	5528 NW Doane	Portland	12SEP2000	continuing occurrence of chronic release/contamination.
0 2189	Columbia Grain Dock		Portland	12SEP2000	Suspected vandalsim caused the release of 5 gallons waste oil.
0 2214			Portland	13SEP2000	Citizen report of oil from home auto repair going down drain.
0 2219	River Place Marina		Portland	15SEP2000	USCG investigated unrecoverable sheen from unknown source.
0 2263	John's Landing Marina		Portland	20SEP2000	100 yd sheen - vessel "Coot" leak from bilge
0 2265	Chemical Plant	3366 Yeon	Portland	20SEP2000	Hercules exceed total Cl- level discharge for AQ permit
0 2283	John's Landing Boat Club		Portland	22SEP2000	vessel "Coot" cracked fuel line and bilge automatically pumped
0 2345	UPRR Brooklyn Yard	424 SE McLoughlin	Portland	29SEP2000	UPRR train accident - release to Brooklyn yard
0 2359		SW 18th & Jefferson	Portland	30SEP2000	Combined sewer system - out manhole
0 2377	Portland Shipyard	5555 N. Channel Avenue	Portland	01OCT2000	FGE power barge "Rio Daluz" - had sump pump overfilled from rain - spilled lube oil
0 2400	Cascade General	5555 N. Basin	Portland	04OCT2000	5 gal of lube oil due to faulty valve on waste removal line - to water between barge and dry dock
0 2402	McCall Oil & Chemical	5480 NW Front	Portland	04OCT2000	150 gal of bunker C #6 - plug failed on meter at tank farm - into bermed containment
0 2454	Chevron Products	5924 NW Front Ave.	Portland	12OCT2000	Vessel hose was prepared to be moved when one cup of boscan crude oil was spilled

Table E-3a. Spills to the Lower Willamette River from DEQ's Spill Information Network.

YR	OERS Site Name	Address	City	Date	Description
0	2500 Cascade General	5555 N. Channel Ave.	Portland	17OCT2000	spill of bunker-like oil (bilge slops) due to failed gasket during cleaning of slop line
0	2509 Foss Maritime Dock	9030 SW St. Helens Road	Portland	18OCT2000	fire boat spilled during refueling - from hole in gas tank - weld failed from previous repair
0	2577 Terminal 2	3556 NW Front Avenue	Portland	25OCT2000	small lube oil/diesel spill from unknown source
0	2596 Greenway	45th & Palatine	Portland	28OCT2000	White substance in ditch
0	2646 Cargill/Irving	800 N. River	Portland	04NOV2000	Black oil discovered between a loading cargo ship and the shore
0	2648	5340 SE Taylor	Portland	04NOV2000	Hose leaked while delivering fuel to a house.
0	2703 near Schnitzer Steel		Portland	11NOV2000	Sheen 50' X 100' - unknown source
0	2730 USCG Dock	6767 N. Basin	Portland	15NOV2000	Unknow material resembling blast grit is "floating" near dock - sinks when touched
0	2792 NW Skyline Rd. & NW Bridge Rd.		Portland	25NOV2000	Sheen of oil on roadway - washed into unnamed creek - non-recoverable
0	2806 Cascade General		Portland	27NOV2000	1 gal vegetable- based hydraulic oil from burst hose
0	2855		Gresham	02DEC2000	River City called to get permission to pump sewage at Barlow HS due to Barlow's truck failure
0	2864 Marquam Bridge		Portland	03DEC2000	MVA - semi flipped on Marquam Bridge releasing fuel to bridge deck - 10-20 gallons reached drains and Willamette River
0	2894 Cascade General	5555 N. Channel Ave	Portland	06DEC2000	Residual oil spilled from equipment being loaded onto a barge - most contained on barge - .5 gal into Willamette River
0	2896	5400 N. Basin Ave.	Portland	07DEC2000	MVA - Semi flipped over - one trailer contained 6,000# 7% NaOH and activator in five totes, (2NaOH, 3 Activator) - one of five leaked. Second trailer contained 393# of class III fireworks on pallets - no spill. Some diesel spilled.

Table E-3a. Spills to the Lower Willamette River from DEQ's Spill Information Network.

YR	OERS Site Name	Address	City	Date	Description
0	2910 Columbia Grain Elevators		Portland	08DEC2000	Vessel "Liberty C" released sheen on Willamette
0	2993 Cascade General ship yard		Portland	19DEC2000	Dredge/barge "Essayons" spilled hydraulic while working on lines - discovered during USCG inspection.
0	3060		Portland	28DEC2000	Urea spilled during off loading from a ship.
1	7 Albina Fuels Dock		Portland	01JAN2001	F/V "Michelle Renee" taking on fuel - human error - mismeasured tank - lost quantity to dock - ~5 gal to river
1	86 Cascade General	5555 N. Channel	Portland	12JAN2001	Oil sheen released from dry dock #4 during the re-float of Navy ship "Tippecanoe"
1	108 J.R. Simplot	14003 N. Rivergate	Portland	15JAN2001	Water flushing from a conveyor system washed oil and debris into river while repairs were being made.
1	144 Cascade General Shipyard		Portland	19JAN2001	Vessel Global Sentinel ruptured hose in bow thruster.
1	223 Swan Island lagoon area		Portland	31JAN2001	Light sheen discharge from outfall - 50'X50'
1	229 marine dock @ Tosco	5528 NW Doane	Portland	31JAN2001	Pipe fitting leaking "cutter stock" oil to river
1	241 Con Metco	13940 N. Rivergate	Portland	01FEB2001	White plume in Willamette - traced to Con Metco - sump releasing water soluble cutting oil to a storm drain.
1	300 Port of Portland	Terminal #6	Portland	09FEB2001	Several drums of varnish leaking on vessel.
1	339		Portland	13FEB2001	White mass in water 20 yds diameter
1	346	800 N. River Street	Portland	16FEB2001	Sheen on Willamette, 50' X 200', between V. Comos Verde and river bank.
1	364		Portland	19FEB2001	Semi punctured fuel tank spilling 50-70 gal. of fuel along Yeon Steet - fuel on pavement and into catch basin.
1	386	Berth 503 - Terminal 5	Portland	20FEB2001	Conveyor belt over load - soda ash released to river (sodium carbonate)

Table E-3a. Spills to the Lower Willamette River from DEQ's Spill Information Network.

YR	OERS Site Name	Address	City	Date	Description
1	434 Gunderson, Inc.	4350 NW Front	Portland	26FEB2001	Solvent spill on dock - 1.5 gal leaked through to river - gtea-415 & toluene - from bucket sitting on dock.
1	451 MCP Bulk Terminals	5300 McLoughlin	Portland	27FEB2001	High fructose spilled to asphalt, then to storm drain during loading of a trailer - due to failure to close valve.
1	979 Oregon Steel Mills	14400 N. Rivergate Blvd.	Portland	27FEB2001	Explosion reported at Oregon Steel Mill. Injuries from the explosion, no fire, no release to water.
1	453	near Hawthorne Bridge	Portland	28FEB2001	Sheen on east side of Willamette river, 50'x15' - source seems to be under water pipe/outfall - caused by asphalt on bridge work being cooled by running water on it
1	587 Portland International Terminl		Portland	05MAR2001	Fuel spill on board vessel - crew used degreaser/dispersant to clean spill - escaped over board through breach of scuppers - not closed correctly
1	526 Terminal 4		Portland	06MAR2001	"Axon Queen" vessel reported to be belching smoke
1	531		Portland	08MAR2001	Oil is flowing out of curb drain pipe on to the street - only during rain storm
1	541	4350 NW Front Ave.	Portland	09MAR2001	Paint spill on soil and report of sludge shoveled into 55 gallon drums - paint may be flammable
1	573		Portland	14MAR2001	"big sheen" on river
1	594	SW Yamhill & SW Park	Portland	16MAR2001	Less than 3 gallons dumped in a storm drain basin - no impact to water
1	602		Portland	18MAR2001	Storm water with oil sheen at Hawthorne Bridge - sheen
1	603		Portland	18MAR2001	8-10,000,000 gallons release at Ankeny Pump Station - PGE equipment failure - power outage
1	682 Tosco	5528 NW Doane	Portland	26MAR2001	Tug refueling operations - diesel to water
1	715 Schnitzer Steel	12005 N. Burgard	Portland	29MAR2001	M/V "Big Blue" spilled unknown quantity of oil/water from ballast pumping at the slip

Table E-3a. Spills to the Lower Willamette River from DEQ's Spill Information Network.

YR	OERS Site Name	Address	City	Date	Description
1	779 Mar Com	8970 N. Bradford	Portland	05APR2001	Sheen on the Willamette under St. John's Bridge - upriver from Mar Com - one "greased goose" observed on a piling.
1	799 Port of Portland		Portland	08APR2001	Ship leaking intermediate through cracks in hull.
1	1023 Oregon Steel Mill	14400 N. Rivergate Blvd.	Portland	03MAY2001	Broken hydraulic line on heavy equipment - release to soil
1	1245 plant & dock	14003 N. Rivergate	Portland	29MAY2001	Crane unloading granular urea barge spilled max. 500 lbs onto dock, ship deck and water
1	1254 T-2, berth 414		Portland	30MAY2001	169 meter M/V "Amori Willow" - bunker oil spill to deck during internal transfer - 1 gal to water
1	1271 JR Simplot	14003 N. Rivergate	Portland	01JUN2001	M/V "Med Intergrity" was at the dock when rain washed an oil sheen of its deck
1	1296		Portland	04JUN2001	Contractor cleaning pipes caused release to storm drain leading to river
1	1352		Portland	10JUN2001	Sheen reported at Willamette River and Columbia Slough
1	1497 Berth 313	700 NE Multnomah	Portland	25JUN2001	M/V "Dansus" - faulty cap caused release
1	1524		Portland	29JUN2001	MVA - semi and jeep head-on - jeep punctured semi 100-150 gal fuel tank - 25-50 into storm drain
1	1708 McCall Oil	5480 NW Front	Portland	13JUL2001	A line coupling failed and allowed oil in a separator to back flow into river.
1	1861		Portland	29JUL2001	Porta-potty floating in Willamette near waterfront
1	1899 Precision Cast Parts	4600 SE Harner	Portland	02AUG2001	Worker fatality - fell into vat of 40-60% NaOH.
1	1980 Cascade General	5555 N. Channel Avenue	Portland	10AUG2001	Slight sheen on Willamette.

Table E-3a. Spills to the Lower Willamette River from DEQ's Spill Information Network.

YR	OERS Site Name	Address	City	Date	Description
1	2062 Willamette Cove		Portland	16AUG2001	
30'	cabin cruiser partly submerged in Willamette River. Sheen noted when discovered.				
1	2085 Portland Harbor		Portland	19AUG2001	
	Unknown heavy black liquid substance flowing into river from storm drain - sinks in water.				
1	2089 RR Bridge		Portland	20AUG2001	
	Oil slick reported on Willamette River.				
1	2191 Portland Harbor		Portland	30AUG2001	
	Sheen - 100x50 yards from a passing barge - stirred up sediments. Not a spill.				
1	2205 Willamette River		Portland	31AUG2001	
	Sheen on Willamette River - 100' X 1500'				
1	2369 Willamette River		Portland	19SEP2001	
	Sheen - unknown source - up against ship at dock				
1	2410 Cascade General Shipyard		Portland	23SEP2001	
	Oil sheen at Cascade Shipyard 4'x12'				
1	2412 Multnomah Harbor	12900 NW Marina	Portland	23SEP2001	
25'	power boat in process of sinking. 25' sheen.				
1	2449 Tosco	5528 NW Doane	Portland	28SEP2001	
	Transferring fuel from tank to barge (Tidewater) sheen on river under dock. Leak from barge from fracture on bulkhead of tank.				
1	2451	4900 NW Front Avenue	Portland	29SEP2001	
	Tug boat sank - no sheen. "Sandy" 41'				
1	2626 M/V Vanis Greva		Portland	17OCT2001	
	M/V "Vanis Greva" release of hydraulic fluid due to equipment failure.				
1	2662 Sea River Maritime		Portland	18OCT2001	
	Sheen on Willamette from T/V "SR Galena Bay"				
1	2671	2925 SE 50th Apt 26	Portland	18OCT2001	
	Drug lab with 10 containers at residence.				
1	2682 Cascade Shipyard, Berth 313		Portland	19OCT2001	
	Leak in the lube oil cooler in engine room. Rainbow sheen 10' x 10'				
1	2685 construction site	3223 NE Killingsworth	Portland	19OCT2001	
	Paint being washed into storm drain. Construction in area.				

Table E-3a. Spills to the Lower Willamette River from DEQ's Spill Information Network.

YR	OERS Site Name	Address	City	Date	Description
1	2743		Portland	24OCT2001	Sheen from box & oil containers that were dropped into river
1	2755	corner of 8th & Grant	Portland	25OCT2001	Abandoned car lab at the corner of 8th & Grant - one anhydrous cylinder, small Nazi lab.
1	2808		Portland	29OCT2001	Sheen near M/V Roger. Sheen old, grey & weathered - not from vessel.
1	2898 Cascade Steel	14400 N Rivergate Blvd.	Portland	07NOV2001	300 gallons of hydraulic fluid release due to equipment failure - to gravel.
1	2913 Pacific Terminal Services	7900 NW St. Helens Road	Portland	08NOV2001	40 gal spill to containment area - pump seal failure - small amount to ground
1	2962 Chevron		Portland	13NOV2001	Chevron Colorado - leak from blade seal on controlable pitched propeller
1	2964 JR Simplot	14003 N. Rivergate Blvd.	Portland	13NOV2001	Light sheen washed from absorbent pads by rains - oil was released during maintenance on a hydraulic unit on barge "Alastra"
1	3070 Willamette River	RM 11.4	Portland	24NOV2001	Sheen reported to NRC - 200' by 10' - gray color.
2	44 West Linn Paper Co.	4800 Mill Street	West Linn	06JAN2002	Paper company equipment failure - 3-5 gallons of high consistency pulp went to waste water treatment, which broke a shaft in the transfer station, which dumped sludge over the cliff and into the river.
	INDUSTRIAL PLANT	SOLID WASTE			5 GAL SURF
2	177 warehouse	SE 10th & Salmon	Portland	20JAN2002	Large warehouse fire impacting two pole mounted transformers - release to asphalt. Amt in each transformer 30 gallons.
	BUSINESS	OIL - TRANSFORMER			60 GAL PAVE
2	184		Portland	21JAN2002	Ship gantry hydraulic line failure - releasing one to two liters of hydraulic oil to Willamette from the "General Via" Phillapine vessel
	VESSEL - CARGO	OIL - HYDRAULIC			1 GAL SURF
2	276	7900 NW St. Helens Road	Portland	28JAN2002	Barrel of oil knocked over on barge being loaded with trash.
	DRUM (55-GAL)	OIL - WASTE OIL			2 GAL SURF

Table E-3a. Spills to the Lower Willamette River from DEQ's Spill Information Network.

YR	OERS Site Name	Address	City	Date	Description
2	294 Oregon Steel Mills	1440 Rivergate Blvd.	Portland	31JAN2002	
	Oregon Steel Mills reporting sheen in parking lot.				
	MOTOR VEHICLE - PRIVATE	OIL - UNKNOWN			2 GAL PAVE
2	465 I-205 Bridge	I-205 MP 25.7 NB	Portland	20FEB2002	
	MVA - semi on bridge - spill to roadway				
	MOTOR VEHICLE - COMMERCIAL	OIL - DIESEL			75 GAL PAVE
2	519 River Place Marina		Portland	28FEB2002	
	Report of sheen on Willamette at River Place Marina.				
	OTHER (DESCRIBE)	OIL - UNKNOWN			1 OTH SURF
2	559	NW 17th between Hoyt & Irving	Portland	05MAR2002	
	Commercial truck hose failure - hydraulic oil spill - some to storm drain.				
	MOTOR VEHICLE - COMMERCIAL	OIL - HYDRAULIC			40 GAL PAVE
2	559	NW 17th between Hoyt & Irving	Portland	05MAR2002	
	Commercial truck hose failure - hydraulic oil spill - some to storm drain.				
	MOTOR VEHICLE - COMMERCIAL	OIL - HYDRAULIC			40 GAL SURF
2	630	300 SW Salmon	Portland	14MAR2002	
	Truck spilled 20 gal of diesel on street - some went to storm drain.				
	MOTOR VEHICLE - COMMERCIAL	OIL - DIESEL			20 GAL PAVE
2	630	300 SW Salmon	Portland	14MAR2002	
	Truck spilled 20 gal of diesel on street - some went to storm drain.				
	MOTOR VEHICLE - COMMERCIAL	OIL - DIESEL			20 GAL SURF
2	740		Portland	29MAR2002	
	Alder Street Outfall - grey chunks going into Willamette. Cellulose grout from storm sewer work upstream.				
	SEWER	SEWAGE			1 OTH SURF
2	824 Willamette River		Portland	08APR2002	
	Overturned tanker on St. John's Bridge filled with anhydrous ammonia - no release.				
	MOTOR VEHICLE - COMMERCIAL	OTHER (DESCRIBE)			0 LBS NONE
2	870 Cascade General Ship yard		Portland	11APR2002	
	Release of 2 liters of oil into Willamette from ship @ pier 304				
	VESSEL - CARGO	OIL - LUBE			1 GAL SURF
2	911 Cascade General	5555 N. Channel	Portland	18APR2002	
	Sheen between the USN Yukon and the containment boom at berth 314, Portland shipyard				
	VESSEL - PUBLIC	OIL - UNKNOWN			1 GAL SURF

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YR	OERS Site Name	Address	City	Date	Description
2	926 Hawthorne Inn	181 NE Halsey	Portland	20APR2002	Chlorine imbalance in swimming pool - 13 children transported to 3 local hospitals with skin irritation and swollen eyes.
	OTHER (DESCRIBE)	CHEMICAL PRODUCT		1 GAL	NONE
2	1144 Owens Corning	11910 NW St. Helens Road	Portland	17MAY2002	Fire and explosion - 110,000 gal AST containing asphalt - no release to water, run off contained.
	BULK PETROLEUM STORAGE	OIL - UNKNOWN		1 OTH	AIR
2	1150	7900 NW St. Helens Road	Portland	18MAY2002	Tanker car valve failed and broke, spilling bunker on private rail spur.
	RAILWAY	OIL - HEATING		200 GAL	SOIL
2	1185	SW Capital Hwy & 41st	Portland	23MAY2002	A can of green paint fell off a pick up truck - stain 6' x 40' on 41st Street
	CONTAINER	OTHER (DESCRIBE)		5 GAL	PAVE
2	1272 Riverplace Marina	SW Montgomery	Portland	03JUN2002	Unknown yellow film on river - 100' long.
	OTHER (DESCRIBE)	OTHER (DESCRIBE)		1 OTH	SURF
2	1308 Oregon Steel	14400 N. Rivergate Blvd.	Portland	06JUN2002	Spill from large piece of contractor equipment - soil impacts.
	HEAVY EQUIPMENT	OIL - HYDRAULIC		65 GAL	SOIL
2	1371	1150 SE 26th	Milwaukee	13JUN2002	MVA - 40 gallons - all in catch basin.
	MOTOR VEHICLE - PRIVATE	OIL - GASOLINE		40 GAL	PAVEMENT
2	1378		Scappoose	13JUN2002	MVA - semi and car. 100 gallons of diesel and 10-15 qts. of motor oil to road shoulder and ditch.
	MOTOR VEHICLE - COMMERCIAL	OIL - DIESEL		100 GAL	SOIL
2	1501 Texaco	5124 SE 17th Ave.	Portland	27JUN2002	Retail customer tore hose off dispenser at gas station - 33 gal to pavement and collected in catch basin.
	UST	OIL - GASOLINE		33 GAL	PAVE
2	1514	1705 SE Oaklodge Ln.	Milwaukie	28JUN2002	Pump station failure - bypass sewage to Willamette.
	SEWER	SEWAGE		1 OTH	SURF
2	1579 PGE	SE Mill between 10th & 11th	Portland	07JUL2002	PCB transformer blew and started fire - bushing failed.
	ELECTRICAL EQUIPMENT	PCB		2 GAL	SOIL

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YR	OERS Site Name	Address	City	Date	Description
2	1595	9030 NW St. Helens Road	Portland	08JUL2002	
	Tug "Lewiston" lost 5 gal while fueling - tug was pre-boomed.				
	VESSEL - TUG	OIL - DIESEL		5 GAL	SURF
2	1793 Lakeside Industries	4850 NW Front Ave.	Portland	26JUL2002	
	Shut off on pump nozzle failed, oil spilled to a concrete pad.				
	OTHER (DESCRIBE)	OIL - DIESEL		20 GAL	PAVE
2	1832 Tosco Facility	5528 Doane Avenue	Portland	31JUL2002	
	Oil released from AST relief valve after a fuel transfer. Spill into containment basin.				
	AST	OIL - LUBE		50 GAL	SOIL
2	1911 Office Depot	5885 N. Basin	Portland	09AUG2002	
	MVA - Delivery truck at office depot hit a curb and damaged radiator.				
	MOTOR VEHICLE - COMMERCIAL	OTHER (DESCRIBE)		10 GAL	PAVE
2	2012 McCuddy's Marina	6767 N. Basin	Portland	18AUG2002	
	Diesel spill from bilge of tug "St. Nicholas". 400' x 100'				
	VESSEL - TUG	OIL - DIESEL		10 GAL	SURF
2	2044	3628 and 3622 SE 13th	Portland	21AUG2002	
	A private sewer line backed up and spewed waste into two basements.				
	SEWER	SEWAGE		100 GAL	SOIL
2	2201	2721 SE 101st	Portland	09SEP2002	
	Report of persons pouring oil onto roof of residence.				
	OTHER (DESCRIBE)	OIL - UNKNOWN		1 OTH	NONE
2	2400 JR Simplot	14003 N Rivergate	Portland	28SEP2002	
	Release of anhydrous ammonia due to equipment failure during transfer.				
	INDUSTRIAL PLANT	HAZARDOUS WASTE		1 LBS	AIR
2	2411 Conoco Phillips	5528 NW Doand Road	Portland	29SEP2002	
	Sheen on Willamette.				
	BULK PETROLEUM STORAGE	OIL - UNKNOWN		1 GAL	SURF
2	2728 Cascade General ship yard	5555 N. Channel Avenue	Portland	09NOV2002	
	Sheen on Willamette.				
	UNKNOWN	OIL - UNKNOWN		1 GAL	PS/BC Fresh Water
2	2728 Cascade General ship yard	5555 N. Channel Avenue	Portland	09NOV2002	
	Sheen on Willamette.				
	UNKNOWN	OIL - UNKNOWN		1 GAL	SURF

Table E-3a. Spills to the Lower Willamette River from DEQ's Spill Information Network.

YR	OERS Site Name	Address	City	Date	Description
2	2896	6018 Boise Street	Portland	05DEC2002	
	Citizen complaint of engines and transmission fluid on neighboring property.				
	OTHER (DESCRIBE)	OIL - UNKNOWN	10 GAL	PS/BC	Land
2	2896	6018 Boise Street	Portland	05DEC2002	
	Citizen complaint of engines and transmission fluid on neighboring property.				
	OTHER (DESCRIBE)	OIL - UNKNOWN	10 GAL	SOIL	
2	2913 BES - pump station	Hwy 43 & Radcliff Road	Portland	07DEC2002	
	Sewage release at pump station.				
	PIPELINE	SEWAGE	600 GAL	PS/BC	Fresh Water
2	2913 BES - pump station	Hwy 43 & Radcliff Road	Portland	07DEC2002	
	Sewage release at pump station.				
	PIPELINE	SEWAGE	600 GAL	SURF	
2	3112		Portland	28DEC2002	
	Sheen on Willamette near international shipping dock - Schnitzer.				
	BUSINESS	OIL - UNKNOWN	1 GAL	PS/BC	Fresh Water
2	3112		Portland	28DEC2002	
	Sheen on Willamette near international shipping dock - Schnitzer.				
	BUSINESS	OIL - UNKNOWN	1 GAL	SURF	

Table E-3b. 2003 Spills to the Lower Willamette River from DEQ's Spill Information Network.

OERS #	Spill Site	Responsible Party	Date	Description	Source	Material(s)	Media Affected
03-2981	5528 NW DOANE AVE PORTLAND	Garwood Oil Co.	12/30/2003	CORNER OF FRONT AND DOANE, A TRUCK OWNED BY GARWOOD OIL COMPANY STRATLED A CHUNK OF ICE AND THE ICE BROKE THE FUEL LINE ON HIS TRUCK. APPROX 15 GAL OF DIESEL SPILLED ONTO THE PAVED STREET. THERE IS A STORM DRAIN IN THE AREA AND THERE IS A POSSIBILITY THAT SOME ENTERED THE DRAIN. SPILL CONTAINED WITH ABSORBENTS. COWLITZ CLEAN SWEEP WILL CONTINUE THE CLEAN UP.	Motor Vehicle - Commercial	15 Gallons of Oil - Diesel	None, Pavement
03-2972	800 N RIVER ST PORTLAND	CLD PACIFIC GRAIN Charles Prouty	12/29/2003	100 gallons of food grade white mineral oil spilled when the tank was overfilled. Absorbent pads, granuals and booms were applied. No impacts to waterways. Cleanup in progress by RP. Charles Prouty Cell 503-572-4393	Container	100 Gallons of Food Waste	None, Pavement
03-2911	PORT OF PORTLAND PORTLAND		12/24/2003	BERTH 604 AND 605. SHEEN APPROX 800X20, UP AGAINST THE DOCK BASE. APPROX 700 FEET OF IT IS NEAR THE HULL OF THE VESSEL DOCKED AT BERTH 605. NAME IS HANJIN MALTA WHICH IS A CONTAINER SHIP THAT IS BEING LOADED AT THIS TIME. DOWNSTREAM FROM STERN OF SHIP APPROX 400 FT THE SHEEN TAILS OUT AND DISAPATES. DOESN'T APPEAR TO BE COMING FROM THE SHIP. THE FULL DOCK HAS BEEN INSPECTED, AS WELL AS THE SHIP NEAR THE SHEEN. UNABLE TO IDENTIFY SOURCE.NO CONTAINMENT AT THIS TIME DUE TO THE VOLUME. MAYBE 1-5 GAL AND IT IS DISSIPATING SO FAST DUE TO WIND AND RAIN.	Unknown		Surface Water
03-2904	3500 NW YEON AVE PORTLAND	Portland Terminal Railroad Co. Robert Stephan	12/23/2003	20 gallons diesel spill to the soil due to a punctured UST. TRC is going to excavate the soil and remove the fuel from the UST. He has left a message for Alicia Voss who is the cleanup project manager.	UST	20 Gallons of Oil - Diesel	Soil
03-2897	417 N BLANDENA ST PORTLAND		12/23/2003	Drug Lab	Drug Lab		None
03-2876	32372 VIEWCREST DR. SCAPOOSE		12/21/2003	Sheen on roadway. No recoverable quantity. No one at residence. Unknown source. NO waterway impacted, no product in nearby ditch. Columbia Co. road crew contacted to see if they want to sand it.	Unknown		None, Pavement
03-2874	1027 SE 82ND AVE PORTLAND		12/20/2003	Officer Steve Jones is a site of a Meth Lab Material Dump at Brady Motors on SE 82nd & Taylor. Two backpacks dumped in the rear of the used car lot. Requesting DEQ arranged removal. Issued I-42 and ORP 936003996.	Drug Lab		None
03-2873	3003 NW 35TH AVE PORTLAND	Columbia American Plating Company	12/20/2003	Water running off site to adjacent ground. Hazmat 6 on scene to catagorize material. They are concerned because the site is an active EPA cleanup site.	Unknown		Soil
03-2863	550 NE COLUMBIA BLVD PORTLAND	ROBERTS MOTOR COMPANY	12/18/2003	Fuel spilled from a diesel tank on the back of a service truck. Fuel spilled onto a paved parking lot and was completely contained in a dry well on the property. Foss Environmental is sending Metro Rooter Plumbing to collect the fuel and properly dispose of it. No environmental impact whatsoever. Due to late hour of incident, notification of DEQ personnel was not made.	Container	30 Gallons of Oil - Diesel	None, Pavement
03-2777	9930 NW SAINT HELENS RD PORTLAND	BP Arco Facility Mitch Lockett	12/12/2003	Mr. Lockett states that the facility is experiencing blurbs of oil rising inside their permanantly boomed area. This happens routinely during periods of high water. Cowlitz Clean Sweep has been hired to address the sheen inside the booms. DEQ Project manager Tom Guiner visiting the site along with URS to assess the incident.	Bulk Petroleum Storage		Surface Water
03-2757	1110 NE 81ST AVE PORTLAND		12/10/2003	Portland Police requesting assistance with Meth Lab on 82st street in Portland.	Drug Lab		None
03-2756	790 NW FRONTAGE RD TROUTDALE	Dart International Berle Tate	12/10/2003	TRUCK DRIVER WITH DARK INTERNATIONAL ADVISING OF A SPILL OF 125 GALLONS OF DIESEL INTO THE PARKING LOT OF THE FLYING J TRAVEL CENTER. DRIVER CLAIMES HE LOST HALF HIS FUEL ESTIMATED 125 GALLONS OF DIESEL	Motor Vehicle - Commercial	125 Gallons of Oil - Diesel	Pavement
03-2750	19000 NE SANDY BLVD GRESHAM	Boeing John Rusoff	12/10/2003	IN THE PROCESS OF DEMOLISHING A BUILDING A SPILL OF METAL INSPECTION FLUID (OIL BASED) WAS DISCOVERED. LOCATION IS COLUMN H385-001 BUILDING. IT WAS DISCOVERED THAT THE INTEGRITY OF U THE PIPING SYSTEM WAS WEAK AND A POTENTIAL AMOUNT OF 42 GAL WAS LEAKED INTO THE SOIL. COWLITZ CLEAN SWEEP OF PORTLAND WILL BE DOING THE CLEAN UP. NO IMPACT TO WATER WAY.	Business	42 Gallons of Chemical Product	Soil
03-2749	4128 SE 65TH AVE PORTLAND		12/10/2003	Behind the four-plex of apartments there are several uncovered containers of oil in a dirt alley which are now overflowing due to heavy rain. Alley is flooded and carrying oil around. John McGregor of BES is dispatching Portland Environmental Services to take a look and will also refer it to Code Enforcement for removal.	Other	1 Gallons of Oil - Waste Oil	Soil

Table E-3b. 2003 Spills to the Lower Willamette River from DEQ's Spill Information Network.

OERS #	Spill Site	Responsible Party	Date	Description	Source	Material(s)	Media Affected
03-2748	7062 MARTIN LUTHER KING BLVD. PORTLAND		12/10/2003	CALLER ADVISED THAT TWO-FIVE GAL BUCKETS AND TWO- TEN GAL BUCKETS OF PAINT WERE DISCOVERED IN THE MIDDLE OF THE ROAD IN FRONT OF HIS BUSN. THE FIVE GAL BUCKETS HAD LOST THEIR CONTENTS AND THE 0 TEN GAL BUCKETS WERE LEAKING. CALLER ADVISED IT WAS RAINING AND RUNNING INTO THE STORM DRAIN. UNK SOURCE OF WHERE THE PAINT CAME FROM. CALLER ALSO ADVISED THAT THE BUCKETS HAD BEEN REMOVED BY AN UNKNOWN PERSON AS HE CALLED INTO OERS. 1201 HRS- ALI DERKS CALLED IN FROM PBES AND ADVISED THAT THE PRODUCT RAN ALONG THE CURB, NOTHING IS RECOVERABLE AND THAT IT HAS RUN INTO THE STORM DRAIN. NO IMPACT TO ANY WATER WAYS.	Container	30 Gallons of Unknown	None, Pavement, Surface Water
03-2747	5325 NE SKYPORT WAY PORTLAND	Sapa Anodizing Skip Lund	12/10/2003	CALLER ADVISES THAT A PAINT BOOTH FOR ALUMINUM PRODUCTS CAUGHT FIRE AT SAPA. LOCATED AT PDX. THEY HAVE BLOCKED THE DRAINS TO THE SLOUGH AND BELIEVE THERE HAS BEEN NO EXPOSURE.	Business		None, Pavement
03-2739	6500 N MARINE DR PORTLAND	Puratos Bakery Supply Peter Hansen	12/09/2003	Truck belonging to Puratos Bakery out of Seattle was backing into the dock and punctured a fuel tank. He lost 25 gallons to the pavement. Absorbent pads and buckets were used to pick-up the fuel. NO waterways impacted.	Motor Vehicle - Commercial	25 Gallons of Oil - Diesel	Pavement
03-2738	HWY 30, MP 17 SCAPPOOSE		12/09/2003	Citizen complaint that Big Oak Marina had boat fire involving several boats about a month ago. He claims they tied the boats together and towed them about 1 to 1 1/2 miles out and left them. One of the boats was hauled out over to the log dump in Columbia County and tied off. They are all burned and have metal sticking out on them etc. He thinks they have just been abandoned.	Vessel - Recreational		Surface Water
03-2734	5300 SE MCLOUGHLIN BLVD PORTLAND	ARCHER DANIELS MIDLAND Kevin Lewis	12/08/2003	Recovering product from area in RR Row drain which may be a drywell. Have Spencer Environmental en-route to complete recovery. Corn sweetener ran to drain. 2100- Will use vac truck connected to drain, wash pavement area to drain.	Business	50 Gallons of Food Waste	Pavement, Soil
03-2632	5555 N CHANNEL AVE PORTLAND		11/25/2003	22-50 gallons of lube oil released during transfer to Navy vessel docked at Swan Island in Portland. 15 gallons to Willamette River. NRC report #706353. John Olmstead with Navy Military Sealift Command is contact on NRC Report. Absorbents and booms deployed & release is secure. OERS contacted USCG who is considering a response.	Vessel - Public	22 Gallons of Oil - Lube	Surface Water
03-2616	4136 SE 34TH AVE PORTLAND	Sunshine Services Glen Rodman	11/24/2003	Xavier Environmental hired to decommission an UST. They sub-contracted Sunshine Services to pump off the remaining heating oil before decommissioning. Human error caused overflow of fuel to the truck tank causing oil spill down driveway.	UST	30 Gallons of Oil - Heating	None, Pavement
03-2599	7945 N FOSS AVE PORTLAND		11/20/2003	Unknown amount of heating oil released to a homeowners basement after an oil delivery by Discount Oil Company. The heating oil leaked from an uncapped line onto the basement floor and into a subsurface drain.	UST	420 Gallons of Oil - Heating	Soil
03-2595	13808 NE AIRPORT WAY PORTLAND	Dawes Transport, Inc. Roy Brace	11/20/2003	320 gallons of WB Flex-Wdd adhesive exploded when the pallet it was on was set down off the lift truck. The estimate a board from the pallet punctured the container when it was set down. It was spilled to the dock and the parking lot. May have impacted two storm drains in the parking lot which outfall to the Columbia River. Foss Environmental is on-scene.	Container	320 Gallons of Chemical Product	Pavement, Surface Water
03-2583	7201 N MARINE DR PORTLAND	Port of Portland Nancy Yunker	11/19/2003	Hustler truck parked on the yard leaked diesel oil. Heavy rain caused diesel to go down the storm drain before anyone could catch it. Storm drain outfalls to the Columbia River. Visible sheen but no recoverable product.	Heavy Equipment	1 Gallons of Oil - Diesel	Surface Water
03-2573	12005 N BURGARD PORTLAND	Gibson Shipholding Captain Krantz	11/18/2003	Less than one gallon hydraulic fluid from a vessel (down the side of the boat) to the water at the Portland International Ship Yard. Broken hydraulic line named as cause for the spill. Spill contained and spilled by the on-board response team for the ship.	Vessel - Cargo	1 Gallons of Oil - Hydraulic	Surface Water
03-2546	NW HERMOSA BLVD. PORTLAND	City of Portland BES Greg East	11/15/2003	Unknown problem causing raw sewage to exit manhole at North Hermosa and McClay. Sewage then reenters next manhole to reenter the system. BES working to fix it. Called BES, no answer.	Other		None, Pavement
03-2544	2251 SE 158TH AVE PORTLAND		11/15/2003	Sgt. Schober of Portland PD requesting contractor to pick-up lab described as a medium size indoor lab. Detectives later found two thick wall chest high cylinders. Lab included two gallons solvents, muriatic acid, acetone and baggie of Red P. Police report three explosions at the home in the past. Issued I-38 and ORP936003990.	Drug Lab	40 Gallons of Drug Lab Waste	None
03-2502	2948 SE 136TH AVE PORTLAND		11/08/2003	Residential meth lab bust with various chemicals including red phosphorus, iodine, solvents. Called Foss to respond. Tim Archer will be responding tot he scene and will coordinate with Sgt. Schoeber of Portland Police. I-37 and ORP 936003989	Drug Lab		None
03-2497	320 SE 39TH AVE PORTLAND		11/06/2003	Meth lab waste to be picked up in PDX. Various bottles of acetone and unknowns. I-36 and ORP 936003988	Drug Lab		None

Table E-3b. 2003 Spills to the Lower Willamette River from DEQ's Spill Information Network.

OERS #	Spill Site	Responsible Party	Date	Description	Source	Material(s)	Media Affected
03-2491	7937 N WASHBURNE AVE PORTLAND		11/05/2003	Drug lab waste consisting of muriatic acid, acetone and unknown liquids in containers. Called Foss to collect, containerize and remove waste. They will coordinate with PDX Police. I-35, ORP936003987.	Drug Lab	3 Gallons of Drug Lab Waste	None
03-2474	5413 NE COLUMBIA BLVD PORTLAND	United Rentals Tim Fisher	10/12/2003	Complaint from ex-employee Mike Bradley reporting a 5 yard dump truck of oil and sludge dumped at United Rental Center on Columbia Blvd. in Portland.	Container		Soil
03-2461	MULTNOMAH CH, APPROX 2 MI SOUTH OF CITY SCAPPOOSE		11/01/2003	A Sheen 300' by 100' floated into the marina on the tide and out again on the change of the tide.	Unknown		Surface Water
03-2387	4735 E BURNSIDE ST PORTLAND		10/26/2003	Meth lab materials found in car towed by PDX Police. Car now at SE Precinct. Small containers (<gal) will pack into 50 gallon drum. Foss dispatched to cleanup and dispose of chemicals and debris. I-33 and ORP936003985.	Drug Lab		None
03-2382	GRAVEL PIT SCAPPOOSE		10/25/2003	A VEHICLE WAS FOUND SUBMERGED IN SHALLOW WATER IN A GRAVEL PIT NEAR SCAPPOOSE. THREE TO SIX QUARTS OF OIL IS BELIEVED TO HAVE SPILLED TO THE WATER, BUT THERE IS NO OUTFALL TO THE POND.	Motor Vehicle - Private	2 Gallons of Oil - Lube	Surface Water
03-2377	9504 N BRADFORD ST PORTLAND		10/25/2003	Sheen on Willamette River near Terminal 4. 8:36 - Blaine reported sheen near Kinder Morgan Plant. Blaine will take a look & contact OERS if DEQ assist needed.	Unknown		Surface Water
03-2355	7027 NW SAINT HELENS RD PORTLAND		10/22/2003	Drug lab cleanup requested.	Drug Lab		None, Pavement
03-2347	7900 NW SAINT HELENS RD PORTLAND	Pacific Terminal Services Troy Goodman	10/22/2003	Vessel Ospray Arrow pumping pitch used in the aluminum anodizing process to the Coppers Industries. Hose passed back to shore with only 3 bolts in end cap rather than 4. The three bolts were not tightened down properly and the 400 degree pitch oozed out of the hose into the water. Estimated 1-2 gallons. Pitch hardens at 40 degrees F. Quickly sank to the bottom.	Vessel - Tanker	2 Gallons of Other	Surface Water
03-2313	13331 NE WHITAKER WY PORTLAND		10/19/2003	Report of drub lab by Portland Drig and Vice. Location is a dump site that contains iodine, red phosphorous, acetone, solvents, acids, misc. cookware and debris. Police requesting cleanup. Contacted Mike Lordos at Foss to initiate cleanup. Issued I-29 and ORP 9360003981.	Drug Lab		None
03-2309	15550 N LOMBARD PORTLAND	Kinder Morgan Jerry Creffa	10/18/2003	Report of soda ash blowing on the docks and into the water. Previously reported to Johnny Baumgartner at DEQ, NWR.	Vessel - Barge		Surface Water
03-2291	7819 SE REEDWAY ST PORTLAND		10/17/2003	Report of drug lab by Portland Drug and Vice. Location contains 1 gallons iodine, 1 gallon red phosphorous, less than 1 gallon acetone, solvents, acids and misc. cookware and debris. Police requested cleanup by DEQ. Contacted Jerry Munson at Foss to initiate cleanup. Issued drug # I-25 and ORP #936003977.	Drug Lab	5 Gallons of Drug Lab Waste	None
03-2281	429 N BRIDGETON RD PORTLAND		10/15/2003	USCG IS INVESTIGATING A ONE HALF MILE GASOLINE SCHEEN ON THE COLUMBIA RIVER AT HAYDEN ISLAND. THE CAUSE OR RESPONSIBLE PARTY IS UNKNOWN.	Unknown		Surface Water
03-2279	8436 NE MARX DR. PORTLAND		10/15/2003	HAZMAT 6 RESPONDED TO A METH LAB AT A PRIVATE RESIDENCE IN PORTLAND. THE LAB IS NOT FUNCTIONAL, RED PHOSPHORUS IS THE ONLY KNOWN CHEMICAL AT THIS TIME. HAZMAT 6 TO DO CLEANUP.	Drug Lab		None
03-2274	7720 SE RAYMOND ST PORTLAND	Seabold Construction Ken Pierce	10/14/2003	APPROXIMATELY 1/2 CUP OF WATERBASED PAINT, MIXED WITH WATER AT A CONSTRUCTION SITE. THE MATERIAL WAS FILTERED THROUGH A HIGH EFFICIENCY FILTRATION BAG SYSTEM PRIOR TO ENTERING THE STORM DRAIN. ABSORBANT MATERIAL USED TO ABSORB ALL THE WATER THAT WAS CONTAINED IN THE GUTTER. CATCH BASINS CLEANED OUT WITH VAC TRUCK FROM RIVER CITY. NEW FILTER BAGS INSTALLED, STREETS SWEEP BY RIVER CITY.	Construction Site		Pavement, Surface Water
03-2257	ALONG RIVER PORTLAND	City of PDX, BES Ivan Blenderman	10/12/2003	Plugged diversion causing overflow of dam to Willamette River at 25 gpm. Emergency Vac Truck from city to clear blockage, stop overflow to river. Bureau of Maint. advised that blockage cleared & overflow stopped at 19:50 on 10/12/2003.	Sewer		Surface Water
03-2248	15527 NE HALSEY ST PORTLAND		10/11/2003	Sewage backup into residential basement. City sewage line. Portland Bureau of Maint. responding.	Sewer	150 Gallons of Sewage	None
03-2241	5620 NE MARTIN LUTHER KING J BLVD PORTLAND		10/09/2003	Sewer back up in show room & warehouse - Portland Bureau of Maint. responding due to sewer blockage & heavy rain.	Sewer		None
03-2240	3209 NE 59TH AV PORTLAND		10/09/2003	Sewage backup & discharge to surface. Portland Bureau of Maint. responding due to sewer blockage & heavy rain.	Sewer		Soil

Table E-3b. 2003 Spills to the Lower Willamette River from DEQ's Spill Information Network.

OERS #	Spill Site	Responsible Party	Date	Description	Source	Material(s)	Media Affected
03-2231	1025 NE COLUMBIA BLVD PORTLAND	Overnight Transportation Bryan Nienaber	10/09/2003	Load shift on truck resulted in multiple container spill in the truck and to a parking lot. Most drums contained residual product. Minimal amount spilled. Hazmat 6 responded.	Drum (55-Gal)		Pavement
03-2229	2220 SE 174TH AVE. UNIT A PORTLAND		10/09/2003	Small drug lab	Drug Lab		None
03-2216	8010 NW ST HELENS RD PORTLAND		10/07/2003	A trace amount of hydraulic oil entered the willamette River at the ACOE dock due to equipment failure. The spill drifted immediately. No containment steps were taken. Trace only, wind dispersed.	Unknown		Surface Water
03-2203	NE 99TH & PACIFIC PORTLAND		10/04/2003	Backpack drug lab bust on the MAX platform. No spills or exposures. ORP936003973.	Drug Lab	5 Gallons of Drug Lab Waste	None
03-2200	7900 NW SAINT HELENS RD PORTLAND		10/04/2003	sheen of unknown oil. - NRC report at 10:30. Larry Lamb reported to NRC. USCG was notified, PO Willson responded but by 13:00 sheen was gone. OERS not notified until 18:00.	Unknown		Surface Water
03-2170	58231 OLD PORTLAND RD SAINT HELENS	Leticia of Oregon Dave Holden	10/01/2003	Complaint from ex-employee that business has a practice of dumping buckets of hydraulic fluid and radiator fluid behind business to gravel. Columbia Co. Fire dispatched to take a look.	Industrial Plant	10 Gallons of Oil - Hydraulic, 10 Gallons of Wastewater (Non-Sewage)	Soil
03-2169	10344 NE SKIDMORE ST PORTLAND		09/30/2003	Box meth lab in car. No spill, no exposure. Drug Lab # I-19, ORP 936003971	Drug Lab	1 Gallons of Drug Lab Waste	None
03-2157	7000 N COLUMBIA WY PORTLAND	Advanced Envirotech Kevin Scherer	09/29/2003	Equipment failure at an AST spilling estimated 100 gallons of diesel into crawl space under residential home. Discovered by First Call Heating and Cooling when they were called out to fill tank. A advanced Envirotech was company who installed AST. They responded within the hour and recovered approximately 40 gallons of free product. Owner reports two stained areas of soil in crawl space and one under the faulty fitting. Took samples from stained areas. Going back 9/30/2003 with short shovels to remove stained soils. Heavy plastic and tar paper vapor barriers prevented the spill from being even more serious.	AST	100 Gallons of Oil - Diesel	Soil
03-2089	622 SW 9TH AV PORTLAND		09/21/2003	Sewage released into apt. complex (Eaton Bldg) due to blockage by roots. Basement Fire & Restoration Services is cleanup contractor. Basement is not occupied. Contained within basement. Maybe city portion of lateral planning to do a controlled release (200-300 gallons). Blockage not found yet, City to do further work in am.	Sewer	50 Gallons of Sewage	None, Pavement
03-2087	SW BARBUR BLVD PORTLAND		09/21/2003	SW Barber & Capitol Hwy East, sewage release. Seepage in a closed area, people cannot enter. Seepage does not appear to public works to be sewage. Homeowner thinks it is. BES will investigate in the AM.	Sewer		Soil
03-2080	3033 SW MOODY AV PORTLAND	City of Portland Environmental Services John O'Donovan	09/20/2003	Discharging @ 25gpm. Unknown if Willamette River has been impacted. Outfall 6 under Ross Island Bridge. Vactor on its way. CBS, diversion ABY804. Bypass occuring at 13:25. Bypass was cleared @ 15:50. BES was contacted @ 14:07, will treat as dry weather bypass.	Sewer	1000 Gallons of Sewage	Surface Water
03-2078	9819 SE STARK ST PORTLAND		09/19/2003	CLOUDY SEARS REPORTS A SEWAGE SPILL OF APPROX 50 GALLONS INTO THE BASEMENT OF AN APARTMENT COMPLEX IN PORTLAND. THE BUILDING IS KNOWN AS THE EATON BUILDING AND HOUSES 10 OCCUPANTS. NO ONE OCCUPIES THE BASEMENT. IT IS UNKNOWN AT THIS TIME IF THIS IS A CITY ISSUE OR NOT. ROOT BLOCKAGE IS A PORTION OF THE CAUSE, APPARENTLY THERE ARE OTHER ISSUES AS WELL. AT THIS TIME THEY ARE NOT ABLE TO VIEW THE LINE BY CAMERA. A PLUMMER IS ON SCENE. FIRE AND RESTORATION SERVICES IS RESPONDING FOR CLEANUP. THE LINE WILL BE FLUSHED INTO THE BASEMENT WHICH WILL RELEASE APPROX 200 TO 300 ADDITIONAL GALLONS OF SEWAGE.	Sewer	50 Gallons of Sewage	None, Pavement
03-2071	9950 SE STARK ST PORTLAND	Toni Romas	09/18/2003	Sewage release at Toni Romas restaurant. Vactor truck on scene shortly to clean mainline. Some sewage is out of the building but contained in parking lot, has been coned off. Portland BES is investigating potential contractor mistake when doing general maintenance. Ivan will update OERS when cleaned up.	Sewer	200 Gallons of Sewage	None, Pavement
03-2058	NE 57TH AVE AT CULLY BLVD. PORTLAND		09/17/2003	City of Portland Sergeant Baldassare 503-793-3797 discovered a drug lab in an automobile. 1 gallon of Iodine, Milk jug, burner, couple small (1 liter) propane tanks, in trunk of car abandoned at intersection. John Dominic Saronce - Transient case # 03-92348	Drug Lab		None, Pavement
03-2008	8500 N COLUMBIA BLVD PORTLAND	UPRR Rick Sloane	09/09/2003	Diesel spill to rock & soil. Train accident on private property. Locomotive collided with other equipment causing a gash in the fuel tank. No waterways affected. UP Environmental on the scene to cleanup.	Railway	15 Gallons of Oil - Diesel	Soil
03-2001	BIKE PATH PORTLAND		09/08/2003	Citizen report of a fluorescent green plume entering the Willamette River near Rossland Sand and Gravel.	Unknown		Surface Water

LWG

Lower Willamette Group

Portland Harbor RI/FS
Programmatic Work Plan
Appendix E: Chemical Sources
April 23, 2004

Table E-3b. 2003 Spills to the Lower Willamette River from DEQ's Spill Information Network.

OERS #	Spill Site	Responsible Party	Date	Description	Source	Material(s)	Media Affected
03-1986	18808 NE HASSALO ST PORTLAND		09/06/2003	Sewage spill underneath a house. Spill has been stopped. Cleanup contractor came to clean. No impact to storm drain or waterway.	Pipeline	200 Gallons of Sewage	Soil
03-1981	BIG OAK MARINA PORTLAND		09/04/2003	Coast Guard reported a 50 gallon release. Reporting party is do Cistendia. He reported to NRC yesterday. Vessel caught fire & release unknown amount of diesel. Sheen reported on September 5. Booms were applied by Cowlitz Clean Sweep. Multiple citizen complaints regarding the handling of the situation by the USCG. Citizens say they could have avoided the sinking by pumping it out following the fire.	Vessel - Recreational	50 Gallons of Oil - Diesel	Surface Water
03-1973	SW NAITO PKWY & ROSS ISLAND BRIDGE PORTLAND	Tri Met Kevin Carsidine	09/05/2003	Equipment malfunction on Tri Met bus released 3 gallons over 1/8 mile of roadway. Spencer hired to clean up. ODOT and Tri Met crews on scene putting down floor sweep. Spill from Front Street up onto Ross Island Bridge. No waterways impacted.	Motor Vehicle - Commercial	2 Gallons of Oil - Hydraulic	Pavement
03-1960	ON SHORE FAIRVIEW		09/03/2003	Some type of oil (1 pint) to the Columbia created a 100' X 100' sheen. Released from 8" pipe due to maintenance activity. OERS got NRC report a while ago but didn't see it on the fax machine. Washington Emergency Response 800-258-5990. Called Steve Young - No answer. Called WA. ER and they had not received notification from NRC. Can't follow-up with ecology because they had not been notified yet.	Business		Surface Water
03-1949	238TH & SANDY BLVD. FAIRVIEW		09/03/2003	STEVE MORRISON WITH HAZMAT 3 TEAM IS RESPONDING TO A AMMONIA LEAK AT THE TOWNSEN FARMS FRUIT PACKING PLANT IN TROUTDALE. POSSIBLY UP TO 25 PEOPLE WERE EXPOSED. THREE PERSONS WERE TRANSPORTED FOR MEDICAL TREATMENT, ONE FEMALE REPORTED TO BE PREGNANT. NO FURTHER INFORMATION ON MEDICAL CONDITION OR IDENTIFIERS. SFM ON CALL TARI GLOCAR WAS NOTIFIED VIA STEVE MORRISON. According to Steve Morrison employees experienced a "burp" in a valve but a clapper shut it off. No real exposure to anyone.	Industrial Plant		Air, None
03-1945	WILLAMETTE RIVER PORTLAND		09/02/2003	Portland MSO called in a 2 gallons gasoline spill. Report of 60' X 300' sheen. They called NRC and faxed it to OERS. No one responded because they felt 2 gallons would dissipate because of heat and wind.	Unknown	2 Gallons of Oil - Gasoline	Surface Water
03-1935	12005 N BURGARD RD PORTLAND	Schnitzer Steel Industries, Inc. Matt Cusma	09/02/2003	Leak in the fuel line site glass identified as cause for 10 gallon diesel spill to deck of barge. Approximately 1 gallon reached Columbia River. Small sheen on water.	Vessel - Barge	10 Gallons of Oil - Diesel	Surface Water
03-1927	2349 NE 159TH AV PORTLAND		09/01/2003	50 Gallons of raw sewage spilled from a manhole to the street. Approximately 20 gallons entered storm drain. Greasy blockage caused bypass. Street area flushed with water to storm drain. 2 miles to storm drain outfalls. Sewage did not reach outfall. Copy of report to be faxed by OERS to DEQ; NWR. BES to file spill report with DEQ.	Sewer	50 Gallons of Sewage	Pavement
03-1923	N. INTERSTATE & N. INTERSTATE PLACE PORTLAND		08/31/2003	Drug Lab in automobile.	Drug Lab		None
03-1881	DOWNSTREAM FROM GLEN JACKSON BRIDGE PORTLAND		08/26/2003	Oil sheen at Cascade Marine/Vancouver Anchorage on Washington shore just downstera of I-5 bridge. May be from earlier wreck/spill on Glen Jackson Bridge I-205 over Columbia River. Reported to USCG by John of Vessel Iini F (motorized) 503-226-4018 or 503-348-6992. Aaron Wieting, DO for Portland BES investigated	Unknown		Surface Water
03-1860	SW 13TH PLACE PORTLAND		08/24/2003	Plate of valve orifice re-directed sewage at diversion point to outfall. City crew repaired plate. Public notice message issued.	Sewer	5 Gallons of Sewage	Surface Water
03-1859	10025 NE SIMPSON ST PORTLAND		08/22/2003	Drug Lab cleanup. Issued I-09, ORP936003960. Summoned Foss to scene per request. 3-4 drums worth of drug lab waste.	Drug Lab	200 Gallons of Drug Lab Waste	Pavement
03-1842	5555 N CHANNEL AV PORTLAND	Ballard Diving & Salvage Rick Benson	08/22/2003	Contractor working on the USNS Sisler at Cascade General spilled hydraulic fluid. Boomed and cleanup in progress. USCG not responding due to reduced manning.	Industrial Plant	10 Gallons of Oil - Hydraulic	Surface Water
03-1834	UNDER BROADWAY BRIDGE PORTLAND	Multnomah County Chuck Maggio	08/21/2003	Orange paint in the Willamette River. Portland fire boat reportedly on scene. Appears to be due to paint work on the Broadway Bridge. Paint crew was hand painting a stripe coat when a worker kicked over a container. The painters used rags to clean up the paint on the work platform but an estimated one pint spilled into the river. Paint is a red Ferrox-A finish coat. crew attempted cleanup using a net on a handle. USCG reportedly approved this cleanup method.	Container	1 Gallons of Other	Surface Water
03-1823	9600 NE ALDERWOOD PORTLAND		08/20/2003	Small Meth Lab in vehicle.	Drug Lab	2 Gallons of Drug Lab Waste	None
03-1755	14400 NW SAINT HELENS RD PORTLAND	Larson's Moorage Ken Larson	08/12/2003	Fire at marina near Sauvie Island bridge sinking at least three boats and damaging two others.	Vessel - Recreational		Surface Water

Table E-3b. 2003 Spills to the Lower Willamette River from DEQ's Spill Information Network.

OERS #	Spill Site	Responsible Party	Date	Description	Source	Material(s)	Media Affected
03-1731	9400 NW ST. HELENS PORTLAND		08/11/2003	Sea Coast barge off-loading JP8. 50-100 gallons of JP8, boomed.	Vessel - Barge	100 Gallons of Chemical Product	Surface Water
03-1681	WILLAMETTE RIVER PORTLAND		08/05/2003	Towing vessel "Johnny Peterson" pushing the barge "Sanderling" ran into Port of Portland Ship Dock @ T-5 behind the Alcatraz Facility.	Vessel - Barge	750 Gallons of Oil - Diesel	Surface Water
03-1619	5924 NW FRONT AVENUE PORTLAND	Chevron Products Tom Trask	07/30/2003	Pressure test on dock lines - <1 cup from bleeding hose during test.	Business	1 Gallons of Oil - Other	Pavement
03-1608	2410 SE 50TH AV PORTLAND		07/29/2003	Elemental mercury spilled to pavement near a closed air conditioning repair shop.	Electrical Equipment	1 Gallons of Chemical Product	Pavement
03-1597	NW NICOLAI ST & NW 23RD AV PORTLAND	Marion Ag Services	07/28/2003	Tote fell over during transport.	Container	300 Gallons of Chemical Product	Pavement
03-1514	841 E POWELL BLVD GRESHAM	Restaurante No 7 Mares Maria Mahoney	07/18/2003	Vegetable oil spill to pavement, some went down storm drain.	Business	40 Gallons of Oil - Other	Pavement
03-1457	23448 NW SAINT HELENS RD PORTLAND		07/10/2003	Report of sewage discharge at Happy Rock Moorage.	Unknown		Surface Water
03-1451	1-84 GRESHAM		07/10/2003	Truck leaked unknown substance to road surface & possibly storm drains - clear and glue-like substance.	Motor Vehicle - Commercial	100 Gallons of Unknown	Soil
03-1443	11501 SE SUNNYSIDE RD CLACKAMAS	PGE Brandi Miller	07/09/2003	PGE truck accident - hit pad mounted transformer, <1 ppm PCB	Electrical Equipment	50 Gallons of Oil - Transformer	Soil
03-1377	34326 JOHNSON'S LANDING ROAD SCAPPOOSE		07/03/2003	Slight sheen around dock.	Unknown	1 Gallons of Oil - Other	Surface Water
03-1357	7900 NW SAINT HELENS ROAD PORTLAND	Pacific Terminal Services Troy Goodman	06/30/2003	PTS was performing tank to tank transfer and observed leak in pipe.	Motor Vehicle - Commercial	840 Gallons of Oil - Diesel	Pavement
03-1342	BERTH 303 PORTLAND	Chevron Texaco Shipping Doug Lathrop	06/29/2003	Hydraulic fluid spilled in water at Swan Island berth 303 - testing port hose and sprung a leak.	Vessel - Cargo	1 Gallons of Oil - Hydraulic	Surface Water
03-1323	8010 NE SANDY BLVD PORTLAND	Autoworld	06/27/2003	Anonymous complaint of business mismanaging waste materials.	Business	1 Gallons of Hazardous Waste, 1 Gallons of Oil - Diesel, 1 Gallons of Oil - Waste Oil	Air, Pavement, Soil
03-1313	17843 SE MCLOUGHLIN BLVD MILWAUKIE	Savas Tuning	06/26/2003	Business dumping antifreeze down the storm drain - in front of complainant's shop.	Business	1 Gallons of Chemical Product	Surface Water
03-1269	NEAR MARINA SCAPPOOSE	David Donaldson	06/22/2003	32' cabin cruiser vessel grounded, leaking diesel - sheen	Vessel - Recreational	100 Gallons of Oil - Diesel	Surface Water
03-1255	11545 NE SANDY BLVD PORTLAND	Jiffy Lube	06/01/2003	Citizen report of mechanic releasing freon into the atmosphere from the car during repair.	Other	5 Gallons of Chemical Product	Air
03-1143	9030 NW ST. HELENS ROAD PORTLAND	Foss Maritime	06/07/2003	1 pint diesel to Willamette River from tug, 'Jon Brix'.	Vessel - Tug	1 Gallons of Oil - Diesel	Surface Water
03-1115	5555 N CHANNEL AV PORTLAND		06/02/2003	Small 8' X 8' sheen out boom of 'Universe Explorer' - believed to be from the 'Venetia', neighboring ship. (see 03-1079)	Vessel - Cargo	1 Gallons of Oil - Other	Surface Water
03-1079	5555 N CHANNEL AVE BLDG 71 PORTLAND	General Steamship Jeff Doerfler	05/29/2003	55 gal of lubrication oil lost from broken tube line. Vessel "Universe Explorer", 630 cruise ship	Vessel - Cargo	55 Gallons of Oil - Lube	Surface Water
03-1010	11920 N BURGARD RD PORTLAND		05/21/2003	Abandoned drums on road. Some tipped over and leaking. 4-5 55 gal, 3-4 30 gal, 4-5 5 gal buckets and misc. cans.	Drum (55-Gal)	420 Gallons of Chemical Product	Pavement, Soil
03-0971	1853 SE 117TH AV PORTLAND		05/16/2003	Unknown black, gooey substance spilled to soil and grass in yard.	Other	15 Gallons of Unknown	Soil
03-0955	UNKNOWN SAINT HELENS	4 Seasons Tree Care Scott Sorenson	05/13/2003	Tank on tree service truck overflowed for ~30 minutes - owner had gone inside and fallen asleep (?)	Business		Pavement, Soil

Table E-3b. 2003 Spills to the Lower Willamette River from DEQ's Spill Information Network.

OERS #	Spill Site	Responsible Party	Date	Description	Source	Material(s)	Media Affected
03-0943	3003 NW 35TH AV PORTLAND	Columbia American Plating Company	05/13/2003	Drums of hazardous waste (cyanide plating sludge) improperly stored outside	Container	55 Gallons of Hazardous Waste	Pavement
03-0903	WILLAMETTE RIVER PORTLAND	Hendren Tow Boat Co Floyd Hendren	05/07/2003	Tug pumped oil bilge water to river in vicinity of St. Johns Bridge	Vessel - Tug	1 Gallons of Oil - Other	Surface Water
03-0880	IN TOWN MILWAUKIE		05/06/2003	Semi hit by car.	Motor Vehicle - Commercial	60 Gallons of Oil - Diesel	Pavement
03-0860	5688 NW SAINT HELENS RD PORTLAND	PGE Jayne Allan	05/04/2003	MVA - 75 gal mineral oil spill - 3 poles went down.	Electrical Equipment	75 Gallons of Oil - Transformer	Pavement
03-0857	RIVERGATE PORTLAND	Port of Portland Nancy Yunker	05/02/2003	Diesel released to Columbia Slough from the Port of Portland T6 refueling station - 3,323 gallons of which, 2,686 reached the water. Went to Willamette and Columbia Rivers.	UST	2686 Gallons of Oil - Diesel	Surface Water
03-0826	1525 N RIVER ST PORTLAND	UPRR Ed Williams	04/29/2003	Leak from train - scrap steel punctured tank.	Railway	200 Gallons of Oil - Diesel	Sediment
03-0747	41 NE WALKER ST PORTLAND		04/15/2003	Aluminum oxide - fell off vehicle onto roadway.	Unknown	2 Gallons of Chemical Product	Pavement
03-0716	14400 N RIVERGATE BLVD PORTLAND	Oregon Steel Mills	04/11/2003	Equipment failure and release hydraulic fluid to soil.	Heavy Equipment	100 Gallons of Oil - Hydraulic	Soil
03-0705	16400 NE AIRPORT WAY PORTLAND		04/09/2003	Mercury released due to breakage of ultraviolet light at a water treatment plant. 1 gm picked up in reactor - 1 gmin chamber - no release to environment	Industrial Plant	1 Gallons of Chemical Product	Surface Water
03-0635	RAMSEY LAKE PORTLAND	Port of Portland Eric Schwanberger	03/28/2003	Port of Portland - T6 - barge w/crane and containers overturned - 36 gal hydraulic oil from crane - end of crane fell off	Vessel - Barge	36 Gallons of Oil - Hydraulic	Surface Water
03-0632	5555 N CHANNEL PORTLAND	Cascade General Alan Sprott	03/28/2003	A piece of metal fell into the work lagoon.	Construction Site	1 Gallons of Oil - Other	Surface Water
03-0628	5528 NW DOANE PORTLAND		03/27/2003	Sheen on Willamette.	Unknown	1 Gallons of Oil - Gasoline	Surface Water
03-0609	11910 NW ST. HELENS RD PORTLAND	Owens Corning Frank Burg	03/25/2003	Asphalt overflowed top of tank during transfer to storage - some entered storm drain, but no surface waters affected.	Bulk Petroleum Storage	800 Gallons of Oil - Unknown	Soil
03-0600	2300 SE HOGAN GRESHAM	Mutual Materials Company Jerry Opplinger	03/24/2003	Petroleum release due to on-site management practices	Other	1 Gallons of Oil - Unknown	Surface Water
03-0592	14141 N RIVERGATE BLVD PORTLAND	Oregon Steel Mills	03/23/2003	Orange cloud air release from steel mill - reported as normal procedure - sighted by USCG	Industrial Plant		Air
03-0527	SE 13TH & SE LINN PORTLAND	PGE Brandy Miller	03/11/2003	Transformer oil contained in substation. No impact to water or soil.	Electrical Equipment	80 Gallons of Oil - Transformer	None
03-0343	W POWELL LOOP GRESHAM	Dunn Construction Michael White	02/10/2003	Vandals tipped "tuc" cart into Johnson Creek - CSSI, water oil emulsion.	Construction Site	20 Gallons of Oil - Crude	Surface Water
03-0201	9504 N BRADFORD ST PORTLAND	"Ansac Harmony" Brandi Miller	01/26/2003	USCG found sheen during inspection of "Ansac Harmony".	Vessel - Cargo	1 Gallons of Oil - Hydraulic	Surface Water
03-0183	8010 NW ST HELENS RD PORTLAND		01/24/2003	A gray sheen appeared inside oil boom at ACOE dock.	Vessel - Public	1 Gallons of Oil - Crude	Surface Water
03-0158	LAKE ROAD/INTERNATIONAL WAY MILWAUKIE	CCX, Inc. Claude Percy	01/22/2003	Sheen on creek - collected in ponding area - some ducks possible affected	Motor Vehicle - Commercial	50 Gallons of Oil - Diesel	Surface Water
03-0091	104TH & SE HOLGATE PORTLAND	Tri-Met Sandy Morey	01/12/2003	Tri-met bus with leaking fuel line - fuel in catch basin.	Motor Vehicle - Commercial	2 Gallons of Oil - Diesel	Pavement
03-0081	26400 NW SAINT HELENS RD SCAPPOOSE	Casselman's Wharf Sherry Casselman	01/11/2003	Houseboat re-roofing project materials being dumped into river. Corrugated aluminum & fiberglass.	Other		Surface Water

Total Spills: 123

Table E-4. Summary of Spills to Willamette River, Portland, Reported to National Response Center, 1982 - 1989¹.

Date	Location	Substance	Quantity	Source
1982				
28-Mar-82	Swan Il Ship Yard Portland Org Sub Station No 5	PCB	Unknown	Transfomer / Leaking
17-May-82	Northwest Marine Ironwork Shipyard, Swan Island	Lube Oil	2 Gal	Tail Shaft Being Pulled While Ship Was In Wet Berth In The Shipyard
24-May-82	River Dock	Marine Diesel	Few Drops	Cargo Line/Valve Malfunc
10-Jun-82	Steel Bridge At Albina Or MP .60	Creosote	1/8 Gal	Accidental Spill From Can
20-Jul-82	Union Oil Docks	Diesel Fuel	2,000 Gal	Transfer Line From Dock To Tank Barge Broke
26-Jul-82	1 Mi N Of St Johns Bdrge In Portland OR	Unknown Oil	Unknown	Unknown Poss Suspect : Refineries Along Bank
26-Jul-82	Willamette River 11400 St Helens Rd Portland, OR	Unknown Oil	Unknown	Unknown/ Coming From Underneath A Piling Bulkhead
13-Dec-82	Same As Adr	Oils: Diesel	2310 Gal	Truck Pulled Out From Pump With Out Disconnecting Hose And Tore Hose From Pump, Matl Entered Storm Drain And Entered River
1983				
22-Mar-86	Willamette River Between Salty And Ross Island Bridges	Unknown Oil	Unknown	Unknown Source//A Sighting
24-Oct-83	Arco Terminal Docks In Linton,OR Part Of Portland, OR.	Oils, Miscellaneous: Lubricating	Unknown Amt Small Sheen	Possible Source - T/V Bald Butte // Have Noticed Oil Bubbling Up From Under Vsl And A Sheen Is Appearing. // Transfer Ops From Ship To Terminal
9-Dec-83	Shell Oil Dock On The Willamette Rvr	Oils: Diesel	>5 Gal	Bleeder Valve Busted Off As A Result Of Metal Fatigue
1984				
18-Jul-84	Above, Dock	Oils: Diesel	150 Gal	Hole In Tank Of Barge Tidewater 36
28-Aug-84	Willamette River Underneath Steel Bridge. Portland OR	Unknown Oil		Unknown. 1/2 Mi Long Slick.

Table E-4. Summary of Spills to Willamette River, Portland, Reported to National Response Center, 1982 - 1989¹.

Date	Location	Substance	Quantity	Source
11-Sep-84	1208 N River Rd Portland OR Up Stream From The Freemon	Other Oil	Unknown	Unknown
1985				
18-Mar-85	Terminal Four Berth 416,415,410 Portland	Unknown Oil	Unknown	Unknown
2-May-85	Marine Dock At Same Address	Oils: Diesel	15 Gal	Fueling Tug/Overflowed Tank
1986				
13-Feb-86	6400 NW Front Ave., Portland, OR - Outfall To River	Ammonium Hydroxide (<28% Aqueous Ammonia)	1200 Gal	Leak Developed In The Tubes Of Their Sys Inner-Cooler
4-Mar-86	200 SE Spokane St Portland	Oils, Miscellaneous: Transformer	<5 Gal	Transformer On Houseboat Dock/Houseboats Broke Loose From Moorings Pulling On Electrical Connections And Rupturing Bushing In Transformer
18-Mar-86	3245 North Willamette Ave In Portland, OR - Storm Sewer To River	Mineral Oil	Est 20 Gal	Vehicle Struck A Pole With Transformer Atop
23-Apr-86	Drydock #4 Swan Island Shipyard Portland	Alaska North Slope Crude	Est 1 Cup	Discharge Pipeline/Oil In Line/Discharging Ballast
16-Jun-86	Swan Island Shipyard, Columbia Rvr In Portland, OR	Hydraulic Oil	Less 1 Gal	Hydraulic Line Parted on the M/V Chevron
25-Jun-86	West End Of Hawthorne Bridge, Portland OR	Paint (Possibly Red Lead)	Est 1-2 Gal	Company Painting Bridge W/O Drop Cloth, Paint Spilled Into River Below; Appeared To Be A Company Boat Trying To Break Up Spillage In The Water
5-Aug-86	At above address	Hydraulic Oil	Est 60 Gal	Filter On Hydraulic Line Failed
1987				
4-Jun-87	Chevron Willow Bridge Dock	Dello/ 6040	3 Gal	Loading Onto Tugboat/ Flexible Hose Fitting Gave Way
11-Jun-87	Swann Island	Diesel Fuel	20 Gal	32' Boat/ Sank/ Unknown Reason

Table E-4. Summary of Spills to Willamette River, Portland, Reported to National Response Center, 1982 - 1989¹.

Date	Location	Substance	Quantity	Source
31-Oct-87	Chevron Dock	#2 Diesel Fuel	50 Gal	Overflow From Fueling A Tug Boat
1988				
16-Nov-88	11400 North West St Helens Rd., Behind GATX Terminal	Unknown Oil	Unknown Sheen Size And Color	Unknown
1989				
29-Jan-89	Willamette River Near St Johns Bridge	#2 Diesel Oil	400 Yds X 150 Yds Sheen	Unknown/ Unknown Sheen. Silvery Flowing In With Tide
15-Feb-89	Shell Docks In Willbridge	100 TQ Lube Oil	?	Loading Lube Oil/Material In Hose When Disconnected
30-Jun-89	Chevron Dock	Diesel Fuel	Amount Of Diesel Fuel In Material Was A Small Perc	Ruptured Facility 16 Inch Pipeline Due To An Unknown Cause During Transfer To Tank Ship. Asphalt And D
28-Dec-89	Swan Island Shipyard, Willamette River	Motor Oil	Sheen 10 Sq Ft	Dredge Essayons, While Transferring To Dredge

¹Locations and abbreviations are reported verbatim from the NRC database.

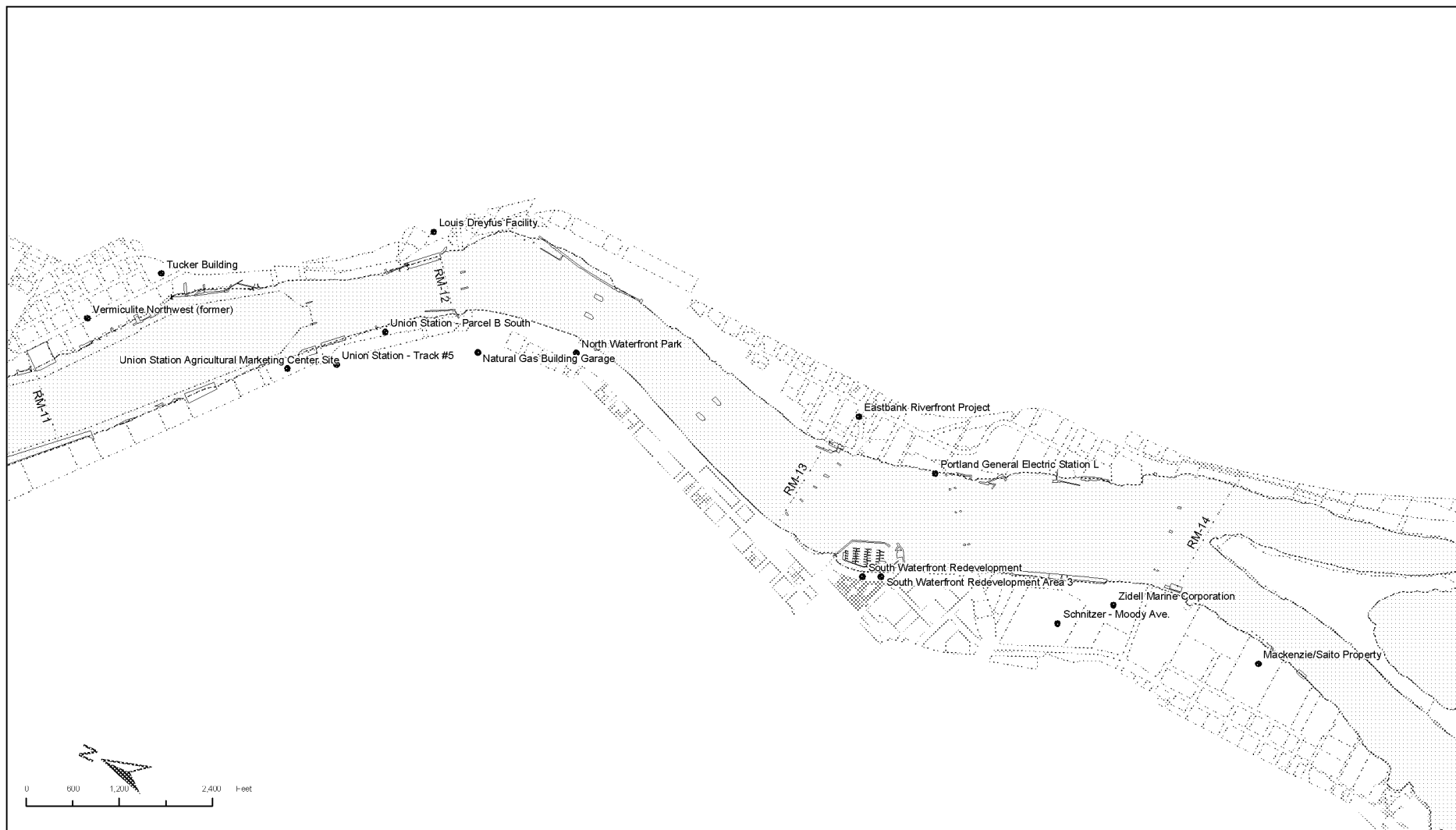
Table E-5. Shoreline or Nearshore Facilities Upstream of RM 11 that are Listed in DEQ's ESCI Database. (All information was compiled from DEQ Site Summary Reports; see Figure E-1 for facility locations).

ESCI #	Facility/SiteName	Address	Type(s) of Operation	Hazardous Substances/Waste Types	Detected Chemicals in Upland Samples ¹	Potential Pathways to River ²
1962	Union Station Agricultural Marketing Center Site	NW Naito Pkwy Portland, OR 97209	railyard	PAHs, petroleum hydrocarbons, lead, arsenic	arsenic (S), lead (S), PAH (S), TPH (S)	
1414	Union Station - Track #5	Union Station Portland, OR 97209	Amtrak refueling of diesel locomotives	diesel fuel	LPAH(B), HPAH(B), diesel(S), ethylbenzene(B), toluene(S), xylenes(S)	DR, SW, GW
1885	Union Station - Parcel B South	between Union Station and Naito Parkway Portland, OR 97209	residential housing (1997 to present), railyard (1890s to 1996)	PAHs, petroleum hydrocarbons, lead, arsenic	arsenic(S), lead(S), PAH (GW), TPH (S)	
2761	Vermiculite Northwest (former)	2303 N Harding St. Portland, OR 97227		asbestos		
3036	Tucker Building	2110 N Lewis Ave. Portland, OR 97227		asbestos, petroleum, PCB	petroleum(S)	
1394	Louis Dreyfus Facility	(foot of) N Holladay St. Portland, OR 97227		petroleum	TPH(S)	DR, GW(unknown)
1138	Natural Gas Building Garage (aka Portland Gas Manufacturing Site)	221 NW 2nd Ave. Portland, OR 97209	former coal/gas manufacturing (Portland Gas and Coke)	coal and oil tars, spent iron oxide, process wastewaters		
876	North Waterfront Park	NW Front Ave. Portland, OR 97209		benzene, toluene, xylene, ethylbenzene	benzene(GW), ethylbenzene(B), toluene(B), xylenes(B)	SW, GW
2414	Eastbank Riverfront Project	Portland, OR 97214		lead, petroleum	lead(S), petroleum(S)	
151	Portland General Electric Station L	1841 SE Water Ave. Portland, OR 97214	steam electric plant, electrical equip. maintenance and warehousing	PCBs, heavy metals, BTEX, PAHs	PCB(S)	DR, GW
602	South Waterfront Redevelopment	SW River Dr. Portland, OR 97201	inactive power plant	PAHs, lead, arsenic, asbestos, PCBs	lead(B), oil(S)	DR, GW
2492	South Waterfront Redevelopment Area 3	SW River Pkwy Portland, OR 97201		PAHs, metals, diesel, lead, oil	PAHs(B), cadmium(GW), chromium(GW), diesel(S), lead(GW), oil(S)	GW
875	Schnitzer - Moody Ave.	Units A, B, & C Moody Ave. Portland, OR 97201	vacant property, former metals salvaging, processing, & pesticides formulation	DDT, hexachloropentadiene, PCBs, TCE, 1,2 DCE, acetone, barium, lead, cadmium, chromium, lead, zinc, carbon disulfide, benzene, toluene, 4- methyl-2 pentanone, ethylbenzene, cineole, cyanide	DDT(S), lead(S), mercury(S), PCBs(S), PAHs(S), zinc(S)	SW, GW
689	Zidell Marine Corporation	3121 SW Moody Ave. Portland, OR 97201	ship dismantling, barge construction, tube forging	metals, petroleum hydrocarbons, asbestos, PCBs	antimony(B), arsenic(S), benzene(GW), chromium(S), lead(S), nickel(B), oil(B), PCBs(B), PAHs(S), tributyltin(S)	DR, GW, SW
1925	Mackenzie/Saito Property	690 SW Bancroft St. Portland, OR 97201	lumber mill (former)	oil-range hydrocarbons, PAHs	benzene(GW), PAHs(GW), ethylbenzene(GW), oil(S), toluene(GW), xylenes(GW)	GW
2409	Ross Island Sand & Gravel Co.	Hardtack Island - Willamette River Milepost 15 Portland, OR 97201		PCBs, PAHs, petroleum, metals, pesticides/herbicides	copper(S), PCBs(S), PAHs(S), tributyltin(S)	GW

Table E-5. Shoreline or Nearshore Facilities Upstream of RM 11 that are Listed in DEQ's ESCI Database. (All information was compiled from DEQ Site Summary Reports; see Figure E-1 for facility locations).

ESCI #	Facility/SiteName	Address	Type(s) of Operation	Hazardous Substances/Waste Types	Detected Chemicals in Upland Samples ¹	Potential Pathways to River ²
883	Willamette Oaks Building	6721 SW Macadam Ave. Portland, OR 97201	dry-cleaning (former), rubber company (former)	PCE, TCE, other solvents associated with dry-cleaning	chlorinated solvents(GW), dichloroethylenes(GW), tetrachloroethylene(GW), trichloroethylene(GW), vinyl chloride(GW)	GW
3104	Rodda Paint Building (former)	6932 SW Macadam Ave. Portland, OR 97219	paint making operation (former)	toluene, xylene-based solvents, mineral spirits, paint wastes containing metals, water-based resins, petroleum hydrocarbons, chlorinated VOCs	acetone(S), butylbenzenes(S), chloroform(GW), cumene(B), dichloroethane(GW), dichloroethylenes(GW), ethylbenzene(S), propylbenzene(B), tetrachloroethylene(GW), toluene(GW), trichloroethane(GW), trichloroethylene(GW), trichloromonofluoromethane(GW), trimethylbenzene(GW), vinyl chloride(GW), xylenes(GW)	GW, SW, WW, DR
123	Huntington Rubber Corp.	7030 SW Macadam Ave. Portland, OR 97219	rubber products manufacturer	petroleum	petroleum-contaminated wastewater	WW
1006	Oaks Bottom Landfill	1S/1E/S23 Portland, OR 97202	closed solid waste landfill	former demolition debris and brush landfill		
1258	Abes Main St. Cleaners	10863 SE Main St. Milwaukie, OR 97222	laundry/dry cleaner	perchloroethylene, trichloroethylene, Stoddard solvent	tetrachloroethylene(B)	GW, WW
2613	Willamette View Inc.	12705 SE River Rd. Portland, OR 97222	retirement home	diesel-range TPH, lead (offsite source suspected)	TPH(B)	GW
812	BLE Inc.	101 Foothills Rd. Lake Oswego, OR 97034	inactive public water supply wells	PCE, TCE, cis-1,2-DCE	VOCs(GW)	GW
2616	Erickson's Automotive	102 Foothills Rd. Lake Oswego, OR 97034		Petroleum, PAHs, VOCs (benzene, toluene, ethylbenzene, xylenes, and chlorinated hydrocarbons)	dichloroethylene(GW), naphthalene(GW), tetrachloroethylene(GW), trichloroethylene(GW)	GW
71	Martin Electric	91 Foothills Rd. Lake Oswego, OR 97034	electrical equipment firm	PCBs from transformer waste oils	PCB 1221(S)	
1066	Gross Property Disposal Site	3S/1E/S2 West Linn, OR 97068	vacant farm land	PCBs	PCBs(S)	
2301	Clackamette Cove Area	16288 Main St. Oregon City, OR 97045		gasoline(BTEX, PAHs), heavy metals, asphalt, diesel & lube oil-range TPH, PAHs, chlorinated hydrocarbons	arsenic(B), chlorobenzene(GW), chromium(S), dichlorobenzene(GW), iron(GW), lead(B), TPH(S)	GW
129	Jeff Lohr Residence	1206 Washington St. Oregon City, OR 97045	private home	PCBs, oil	oil- or fuel- related compounds(S), PCBs(S)	
283	Willamette Falls Locks	West Linn, OR 97068	water transportation, freight	heavy metals, ammonia, methylene chloride, oils, latex, clarified white water	ammonia(S), arsenic(S), chromium(S), lead(S), methylene chloride (surface water)	DR
263	West Linn Paper Company	4800 Mill St. West Linn, OR 97068	wood pulping and specialty paper mill	oil, PCBs	oil- or fuel- related compounds(S), PCB 1221(S)	DR, GW
2114	Sullivan Electrical Substation	5600 Willamette Falls Dr. West Linn, OR 97068	electrical substation			

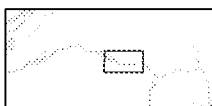
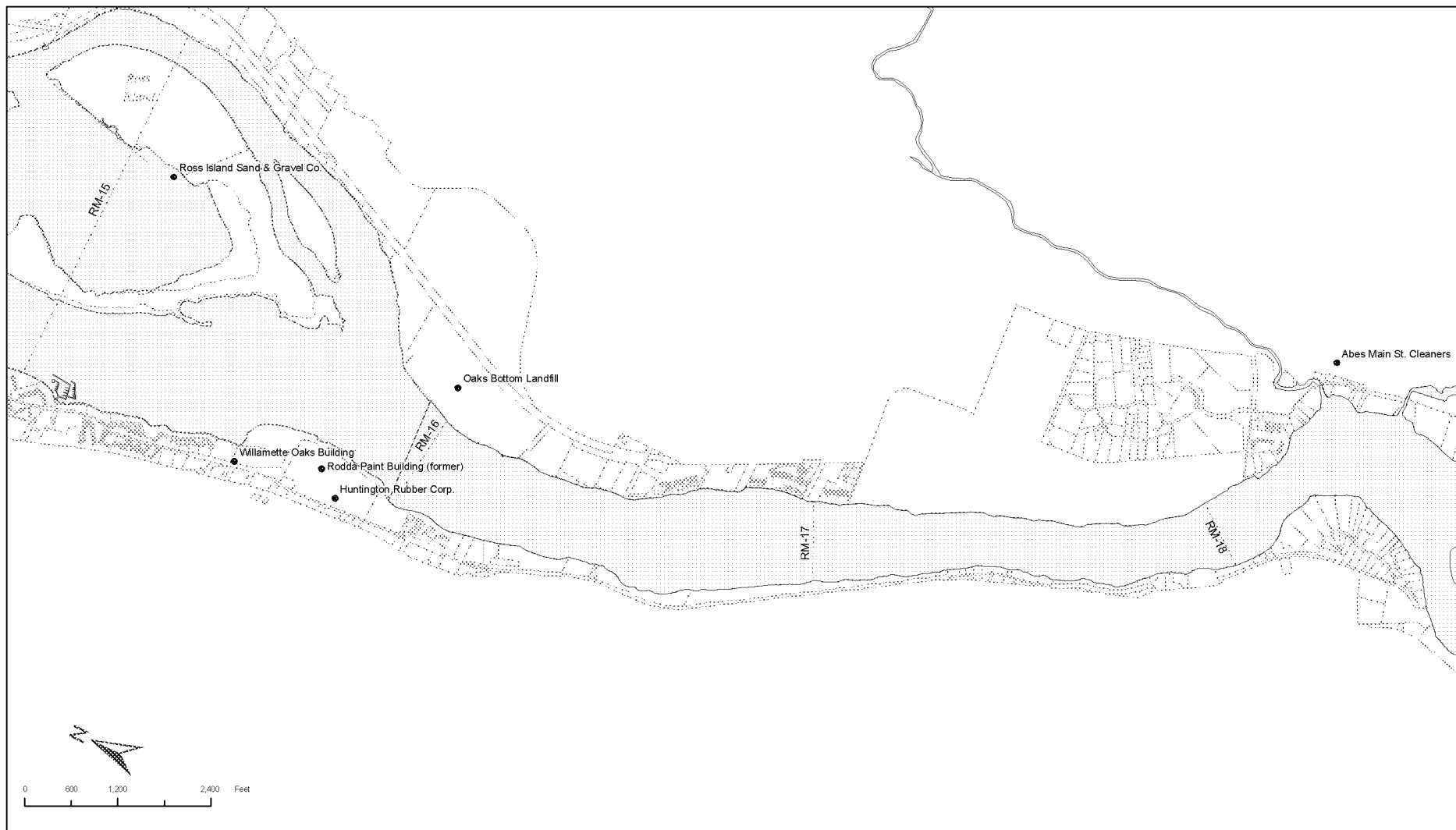
¹S=soil or sediment, GW=groundwater, B=both²Pathways Identified in ESCI Site Summary Reports: GW = groundwater, SW = stormwater/surface runoff, WW = wastewater discharge, DR = direct release, spill



FEATURE SOURCES:
 Transportation, Water, Property, Zoning or Boundaries: Metro RUS
 Channel & River Miles: Developed from US Army Corps of Engineers information
 River Edge: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos
 Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos
 Historic Sampling Locations: Created from Category 1 and 2 LWG Surface Sediment Data with tag where sampling occurred prior to dredging event
 Round 1 sampling locations: LWG database query of sediment samples
 File name: WorkPlan2003_Ap-F_NON-ISA-FacilitiesLocatorMap.mxd
 PLOT DATE: 02/1/03



Figure E-1a
Portland Harbor R/I/FS
Appendix E
ECSI Facilities Upstream of River Mile 11
(See Table E-5)

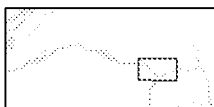
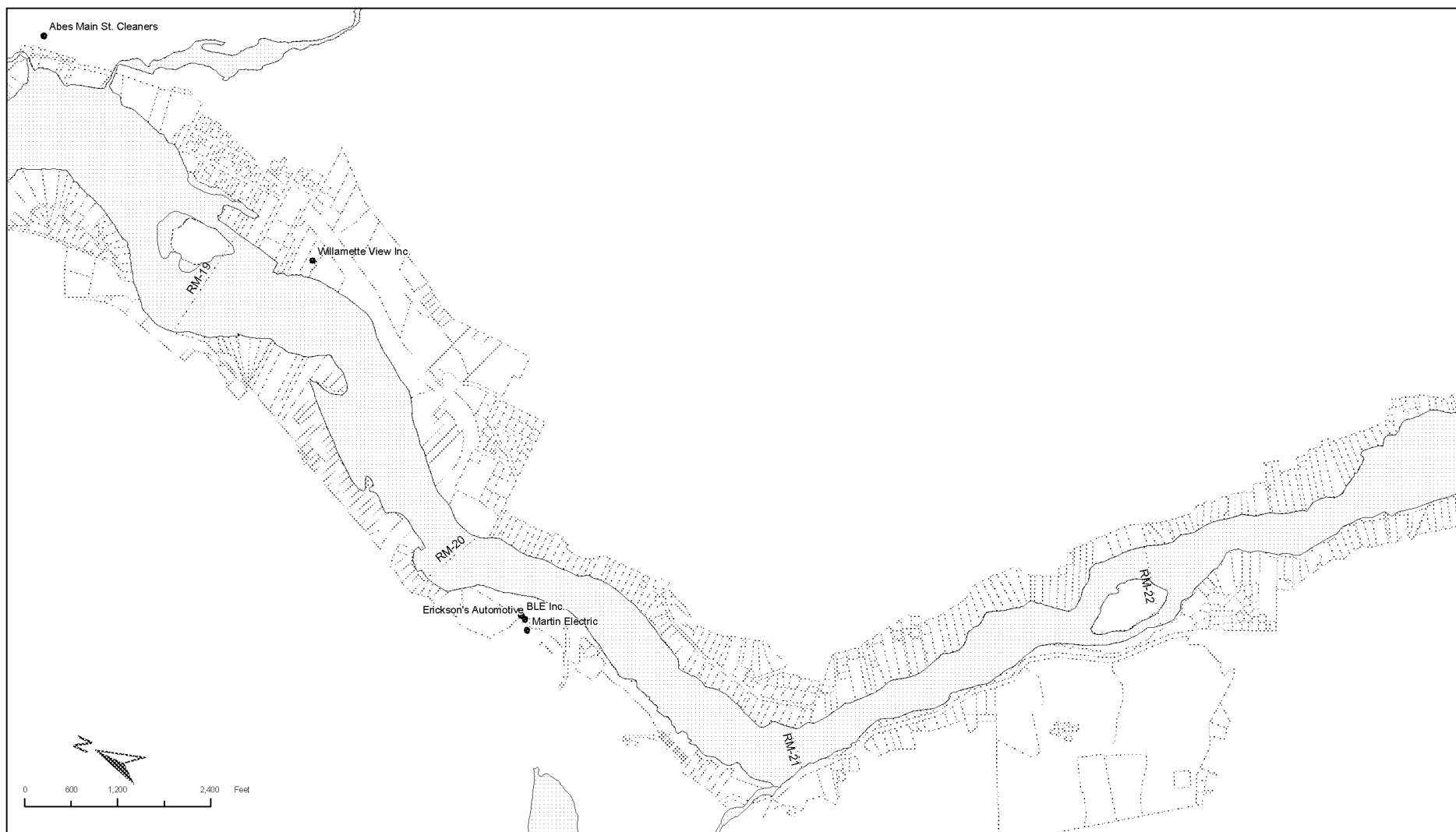


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 River Edge: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos
 Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos
 Historic Sampling Locations: Created from Category 1 and 2 LWG Surface Sediment Data with tag where sampling occurred prior to dredging event
 Round 1 sampling locations: LWG database query of sediment samples
 File name: WorkPlan2003_Ap-F_NON-ISA-FacilitiesLocatorMap.mxd
 PLOT DATE: 02/1/03

Legend

- ECSI Upstream Facilities
- Navigation Channel
- River Miles
- Docks & in-water structures - 2001
- Waterfront Taxlots

Figure E-1b
Portland Harbor RI/FS
Appendix E
ECSI Facilities Upstream of River Mile 11
(See Table E-5)



FEATURE SOURCES:
 Transportation, Water Property, Zoning or Boundaries: Metro RUS
 Channel & River Miles: Developed from US Army Corps of Engineers information
 River Edge: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos
 Docks & In-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos
 Historic Sampling Locations: Created from Category 1 and 2 LWG Surface Sediment Data with tag where sampling occurred prior to dredging event
 Round 1 sampling locations: LWG database query of sediment samples
 File name: WorkPlan2003_Ap-F_NON-ISA-FacilitiesLocatorMap.mxd
 PLOT DATE: 02/1/03

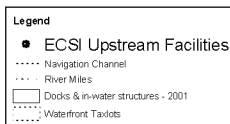
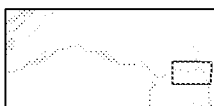
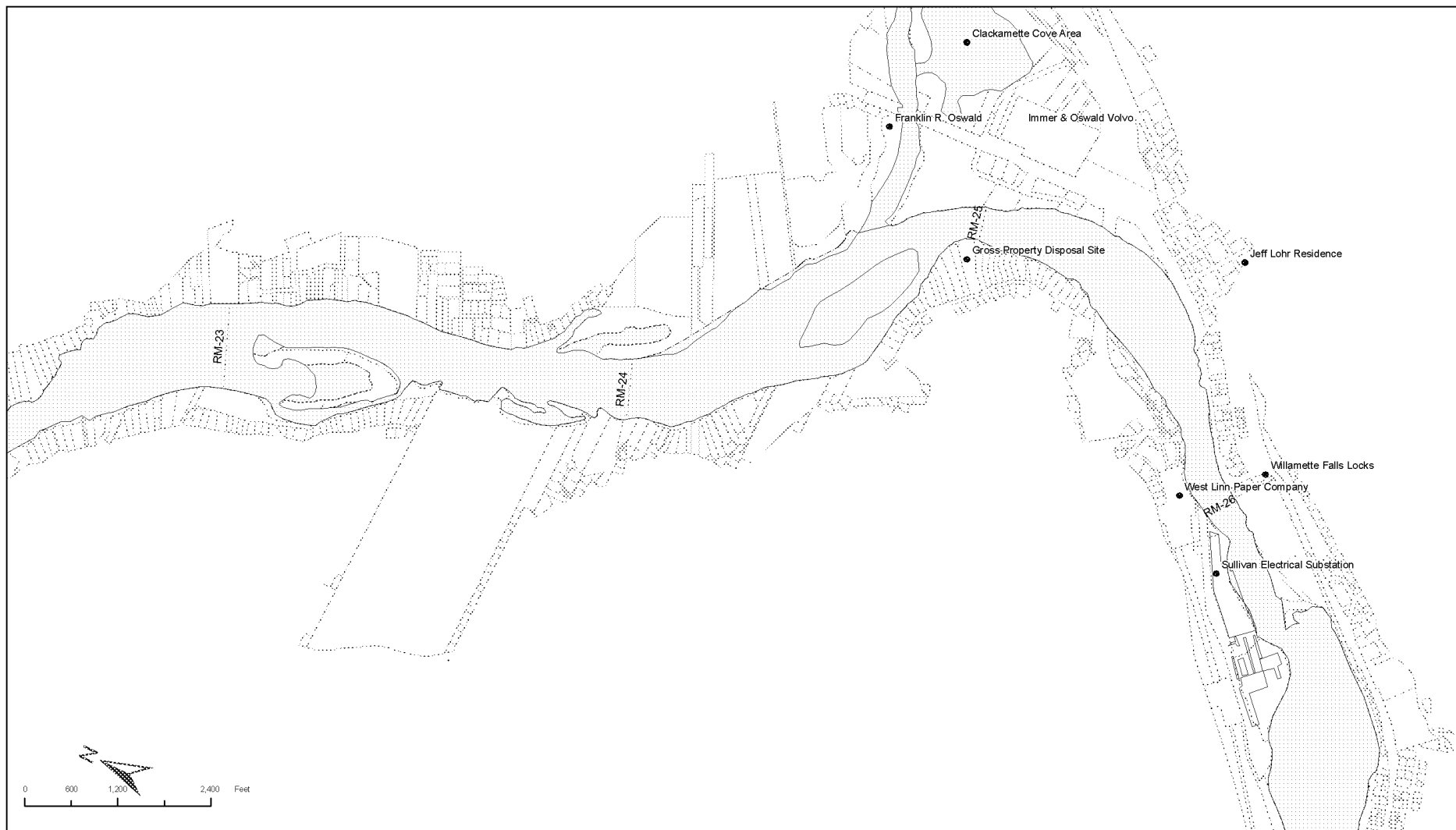


Figure E-1c
Portland Harbor R/FS
Appendix E
ECSI Facilities Upstream of River Mile 11
(See Table E-5)



FEATURE SOURCES:
 Transportation, Water Property, Zoning or Boundaries: Metro RUS
 Channel & River miles: Developed from US Army Corps of Engineers information
 River Edge: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos
 Docks & in-water Structures: created by heads-up digitizing from the October 2001 0.33 ft. resolution color orthophotos
 Historic Sampling Locations: Created from Category 1 and 2 LWG Surface Sediment Data with tag where sampling occurred prior to dredging event
 Round 1 sampling locations: LWG database query of sediment samples
 File name: WorkPlan2003_Ap-F_NON-ISA-FacilitiesLocatorMap.mxd
 PLOT DATE: 02/1/03



Figure E-1d
Portland Harbor RI/FS
Appendix E
ECSI Facilities Upstream of River Mile 11
(See Table E-5)



**National
Response
Center**

Our Response Communications Today Helps Better The Environment Tomorrow

1(800)424-8802

Oct. 16, 2003

Betsy D. Striplin
Striplin Environmental Assoc., INC.
15111 8th Avenue SW, Suite 303
Seattle, WA 98166

FREEDOM OF INFORMATION REQUEST (USCG CONTROL NUMBER 03-2149)

Dear Ma'am:

I have received your letter request date 12 Sep 2003 for copies of discharge (spill) reports submitted to the National Response Center (NRC) concerning any releases to the Willamette River between mile marker 0-26.5 in Oregon.

The NRC database was searched using the following criteria:

State: %OR%
Location: %Willamette River%

The "%" sign is a wildcard in our database that brings up all reports fitting the criteria.

Based on that search, the information you requested is enclosed. This information is based upon reports received by the NRC. Since the database only contains information "as reported" to the NRC, the information may not reflect the actual number of releases (spills) that occurred, the amount of material released (spilled), or complete information on the location. There are no other offices within the Coast Guard in which responsive records are likely to be found. The remainder of our database, 1982-1989, can be searched on our website at www.nrc.uscg.mil.

You may appeal this determination within 30 days from the date of this letter. Address your appeal to:

Commandant (G-CIM-2)
2100 Second Street SW
Washington DC 20593-0001

Your appeal should include reasons for reconsideration.

If the NRC can be of any further assistance, please call (202) 267-2675.

Sincerely,

A handwritten signature in black ink, appearing to read "S. L. Edwards", is written over a horizontal line.

S. L. EDWARDS
Lieutenant Junior Grade
U.S. Coast Guard
By direction

Serving the National Response System since 1974
2100 Second Street SW Washington, DC 20593 • Commercial 202-267-2165 • Facsimile 202-267-2165
Visit our web site <http://www.nrc.uscg.mil>



National Response Center

Our Response Communications Today Helps Better The Environment Tomorrow

1(800)424-8802

Oct. 16, 2003

Betsy D. Striplin
Striplin Environmental Assoc., INC.
15111 8th Avenue SW, Suite 303
Seattle, WA 98166

FREEDOM OF INFORMATION REQUEST (USCG CONTROL NUMBER 04-0065)

Dear Ma'am:

I have received your letter request date 12 Sep 2003 for copies of discharge (spill) reports submitted to the National Response Center (NRC) concerning any releases to the Willamette River between mile marker 0-26.5 in Oregon.

The NRC database was searched using the following criteria:

State: %OR%
Location: %Willamette River%

The "%" sign is a wildcard in our database that brings up all reports fitting the criteria.

Based on that search, the information you requested is enclosed. This information is based upon reports received by the NRC. Since the database only contains information "as reported" to the NRC, the information may not reflect the actual number of releases (spills) that occurred, the amount of material released (spilled), or complete information on the location. There are no other offices within the Coast Guard in which responsive records are likely to be found. The remainder of our database, 1982-1989, can be searched on our website at www.nrc.uscg.mil.

You may appeal this determination within 30 days from the date of this letter. Address your appeal to:

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Sincerely,

A handwritten signature in black ink, appearing to read "S. L. Edwards", is written over a horizontal line.

S. L. EDWARDS
Lieutenant Junior Grade
U.S. Coast Guard
By direction

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NATIONAL RESPONSE CENTER - PUBLIC FAX
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Incident Report # 644071

INCIDENT DESCRIPTION

xReport taken by: CIV RAWLS at 14:42 on 05-MAY-03
Incident Type: STORAGE TANK
Incident Cause: UNKNOWN
Affected Area: WILLIAMETTE RIVER
The incident was discovered on 29-APR-03 at 19:30 local time.
Affected Medium: WATER WILLIAMETTE RIVER

SUSPECTED RESPONSIBLE PARTY

Name: UNKNOWN

XX

Type of Organization: UNKNOWN

INCIDENT LOCATION

County: CLACKAMAS
City: OREGON CITY State: OR
THE WILLIAMETTE RIVER JUST BELOW THE OREGON CITY FALLS. OREGON
CITY, OR

RELEASED MATERIAL(S)

CHRIS Code: UNK Official Material Name: UNKNOWN MATERIAL
Also Known As:
Qty Released: 0 UNKNOWN AMOUNT Qty in Water: 0 UNKNOWN AMOUNT

DESCRIPTION OF INCIDENT

//WEB REPORT//MYSTERY DRUM IN WILLIAMETTE RIVER. UNKNOWN CONTENTS.

INCIDENT DETAILS

Description of Tank: BLACK PLASTIC DRUM
Tank Above/Below Ground: ABOVE
Transportable Container: YES
Tank Regulated: UNKNOWN
Tank Regulated By:
Tank ID:
Capacity of Tank: 55 GALLON(S)
Actual Amount:
---WATER INFORMATION---
Body of Water: WILLIAMETTE RIVER
Tributary of:
Nearest River Mile Marker:
Water Supply Contaminated: NO

DAMAGES

Fire Involved: NO Fire Extinguished: UNKNOWN
INJURIES: Hospitalized: Empl/Crew: Passenger:
FATALITIES: Empl/Crew: Passenger: Occupant:
EVACUATIONS: Who Evacuated: Radius/Area:

Damages:

Closure Type	Description of Closure	Hours Closed	Direction of Closure
Air:	N		
Road:	N		Major N Artery:
Waterway:	N		
Track:	N		

Media Interest: NONE Community Impact due to Material: NO

REMEDIAL ACTIONS

MSO PORTLAND HIRED FOSS ENVIRONMENTAL TO REMOVE DRUM, WHICH THEY DID 30 MAY 03.
Release Secured: UNKNOWN
Release Rate:
Estimated Release Duration:

WEATHER

Weather: UNKNOWN, :F

ADDITIONAL AGENCIES NOTIFIED

Federal:
State/Local:
State/Local On Scene:
State Agency Number:

NOTIFICATIONS BY NRC

ATSDR OR ATTN: THEODORA TSONGAS	
05-MAY-03 14:53	(503)7314025
NOAA 1ST CLASS BB RPTS FOR OR	
05-MAY-03 14:53	(206)5266344
NATIONAL RESPONSE CENTER HQ	ME
15-OCT-03 17:57	
MSO PORTLAND, OR	PO BEEBE
05-MAY-03 14:55	(503)2409379
OREGON EMERGENCY MANAGEMENT	
05-MAY-03 14:53	(800)4520311

ADDITIONAL INFORMATION

A MYSTERY DRUM WAS SIGHTED BY TUALATIN VALLEY, HAZMAT 9 AND TO MSO PORTLAND, OR. MSO PORTLAND HIRED FOSS ENVIRONMENTAL TO REMOVE DRUM.

*** END INCIDENT REPORT 644071 ***

Report any problems or Fax number changes by calling 1-800-424-8802
PLEASE VISIT OUR WEB SITE AT <http://www.nrc.uscg.mil>

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Incident Report # 406565

INCIDENT DESCRIPTION

xReport taken by: MST3 CHANCELLOR at 14:06 on 07-OCT-97
Incident Type: UNKNOWN SHEEN
Incident Cause: UNKNOWN
Affected Area:
The incident was discovered on 07-OCT-97 at 10:50 local time.
Affected Medium: WATER WILLIAMETTE RIVER

SUSPECTED RESPONSIBLE PARTY

Name: UNKNOWN

XX

Type of Organization: UNKNOWN

INCIDENT LOCATION

9030 NW ST HELENS ROAD County: MULTNOMAH
NEAR DOCK
City: PORTLAND State: OR Zip: 97267

RELEASED MATERIAL(S)

CHRIS Code: OUN Official Material Name: UNKNOWN OIL
Also Known As:
Qty Released: 0 UNKNOWN AMOUNT Qty in Water: 0 UNKNOWN AMOUNT

DESCRIPTION OF INCIDENT

UNKNOWN / UNKNOWN SHEEN SIGHTING, SHEEN SIZE: 400 BY 150 FT /
COLOR:RAINBOW

INCIDENT DETAILS

Platform Rig Name:
Platform Letter:
Location Area ID:
Location Block ID:
OCSG Number:
QCSP Number:
State Lease Number:
Pier Dock Number:
Berth Slip Number:

DAMAGES

Fire Involved: NO Fire Extinguished: UNKNOWN
INJURIES: Hospitalized: Empl/Crew: Passenger:
FATALITIES: Empl/Crew: Passenger: Occupant:
EVACUATIONS: Who Evacuated: Radius/Area:
Damages:

Hours Direction of

Closure Type Description of Closure Closed Closure
Air: N

Road: N

Waterway: N

Track: N

Major N
Artery:

Media Interest: Community Impact due to Material: NO

REMEDIAL ACTIONS

NONE
Release Secured: UNKNOWN
Release Rate:
Estimated Release Duration:

WEATHER

ADDITIONAL AGENCIES NOTIFIED

Federal:
State/Local:
State/Local On Scene:
State Agency Number:

NOTIFICATIONS BY NRC

ATSDR OR ATTN: ELIZABETH ESSEKS	?????
07-OCT-97 00:00	(503)4944278
ATSDR WA ATTN: LUCY HARTER	?????
07-OCT-97 00:00	(360)5865529
NOAA 1ST CLASS BB RPTS FOR OR	?????
07-OCT-97 00:00	(202)5266329
NATIONAL RESPONSE CENTER HQ	ME
15-OCT-03 18:03	
MSO PORTLAND, OR	PO KLARMANN
07-OCT-97 14:13	
OREGON EMERGENCY MANAGEMENT	?????
07-OCT-97 00:00	(503)5881378
WA STATE EMERGENCY MANAGEMENT	?????
07-OCT-97 00:00	(360)4387395

ADDITIONAL INFORMATION

WX/CURRENT:LOW WIND:SW 5 KTS COVER:CLDY TEMP:60

xxx END INCIDENT REPORT 406565 xxx
Report any problems or Fax number changes by calling 1-800-424-8802
PLEASE VISIT OUR WEB SITE AT <http://www.nrc.uscg.mil>

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Incident Report # 93331

INCIDENT DESCRIPTION

*Report taken by: MST3 WIKER at 17:19 on 22-OCT-91
Incident Type: UNKNOWN SHEEN
Incident Cause: UNKNOWN
Affected Area:
The incident was discovered on 19-OCT-91 at 09:03 local time.
Affected Medium: WATER WILLAMETTE RIVER

SUSPECTED RESPONSIBLE PARTY

Name: UNKNOWN

XX

Type of Organization: UNKNOWN

INCIDENT LOCATION

WILLAMETTE RIVER County: UNKNOWN
MILE 8.2
City: PORTLAND State: OR
Latitude: 45 Degrees 34' 1" N
Longitude: 122 Degrees 43' 6" W

RELEASED MATERIAL(S)

CHRIS Code: OHY Official Material Name: HYDRAULIC OIL
Also Known As:
Qty Released: 5 GALLON(S) Qty in Water: 5 GALLON(S)

DESCRIPTION OF INCIDENT

UNKNOWN / UNKNOWN

INCIDENT DETAILS

Platform Rig Name:
Platform Letter:
Location Area ID:
Location Block ID:
OCSG Number:
OCSF Number:
State Lease Number:
Pier Dock Number:
Berth Slip Number:

DAMAGES

Fire Involved: NO Fire Extinguished: UNKNOWN
INJURIES: Hospitalized: Empl/Crew: Passenger:
FATALITIES: Empl/Crew: Passenger: Occupant:
EVACUATIONS: Who Evacuated: Radius/Area:
Damages:

Hours Direction of

Closure Type Description of Closure
Air: N

Closed Closure

Road: N

Major N
Artery:

Waterway: N

Track: N

Media Interest: Community Impact due to Material: NO

REMEDIAL ACTIONS

4 GALLONS RECOVERED.

Release Secured: UNKNOWN

Release Rate:

Estimated Release Duration:

WEATHER

ADDITIONAL AGENCIES NOTIFIED

Federal:

State/Local:

State/Local On Scene:

State Agency Number:

NOTIFICATIONS BY NRC

NATIONAL RESPONSE CENTER HQ ME

15-OCT-03 18:07

MSO PORTLAND, OR

22-OCT-91 17:24

ADDITIONAL INFORMATION

MSIS MP91011012

*** END INCIDENT REPORT 93331 ***

Report any problems or Fax number changes by calling 1-800-424-8802

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Incident Report # 544688
***** THIS IS A DRILL *****
INCIDENT DESCRIPTION

*Report taken by: CIV VAUSS at 09:39 on 10-OCT-00
Incident Type: PIPELINE
Incident Cause: EQUIPMENT FAILURE
Affected Area: WILLAMETTE RIVER
The incident occurred on 10-OCT-00 at 06:10 local time.
Affected Medium: WATER WILLIAMETTE RIVER

SUSPECTED RESPONSIBLE PARTY

Name: JOHN FERDIS
Organization: CHEVERON PRODUCTS CO
Address: 5924 N.W. FRONT AVE
PORTLAND, OR 97210
PRIMARY Phone: (503)2217890
Type of Organization: PRIVATE ENTERPRISE

INCIDENT LOCATION

5924 N.W. FRONT AVE County: MULTNOMAH
City: PORTLAND State: OR Zip: 97210

RELEASED MATERIAL(S)

CHRIS Code: NCC Official Material Name: NO CHRIS CODE
Also Known As: VACUUM GAS OIL
Qty Released: 300 BARREL(S) Qty in Water: 300 BARREL(S)

DESCRIPTION OF INCIDENT

THIS IS A DRILL///THE MATERIAL IS RELEASING FROM AN OUT OF SERVICE
PIPELINE HOSE DUE TO HOSE FAILURE.

INCIDENT DETAILS

Pipeline Type: OTHER
DOT Regulated: UNKNOWN
Pipeline Above/Below Ground: ABOVE
Exposed or Under Water: NO
Pipeline Covered: UNKNOWN
---SHEEN INFORMATION---
Sheen Color: UNKNOWN
Sheen Odor Description:
Sheen Travel Direction:
Sheen Size Length: 100 YARDS
Sheen Size Width: 50 YARDS
---WATER INFORMATION---
Body of Water: WILLAMETTE RIVER
Tributary of: COLUMBIA RIVER
Nearest River Mile Marker:
Water Supply Contaminated: NO

DAMAGES

Fire Involved: NO Fire Extinguished: UNKNOWN

INJURIES: Hospitalized: Empl/Crew: Passenger:
FATALITIES: Empl/Crew: Passenger: Occupant:
EVACUATIONS: Who Evacuated: Radius/Area:
Damages:

Closure Type	Description of Closure	Hours Closed	Direction of Closure
Air:	N		
Road:	N		Major N Artery:
Waterway:	N		
Track:	N		

Media Interest: NONE Community Impact due to Material: NO

REMEDIAL ACTIONS

CLEAN RIVERS COOP CONTRACTOR HAS BEEN HIRED, TAKING STEPS TO
CONTAIN THE SPILL
Release Secured: YES
Release Rate:
Estimated Release Duration: 50 MINUTE

WEATHER

Weather: RAINY, 60:F
Wave Condition: 0 CALM

ADDITIONAL AGENCIES NOTIFIED

Federal: MSO PORTLAND
State/Local: OERS, WA ERS
State/Local On Scene:
State Agency Number:

NOTIFICATIONS BY NRC

ATSDR OR ATTN: RICK LEIKER	
10-OCT-00 09:51	(503)7314025
ATSDR WA ATTN: LUCY HARTER	
10-OCT-00 09:51	(360)2363364
NOAA 1ST CLASS BB RPTS FOR OR	
10-OCT-00 09:51	(206)5266344
NATIONAL RESPONSE CENTER HQ	ME
15-OCT-03 18:02	
OREGON EMERGENCY MANAGEMENT	
10-OCT-00 09:51	(800)4520311
WA STATE EMERGENCY MANAGEMENT	
10-OCT-00 09:51	(800)2585990

ADDITIONAL INFORMATION

THIS IS A DRILL///THE RELEASE WAS STOPPED AT 6:20AM.

*** END INCIDENT REPORT 544688 ***

Report any problems or Fax number changes by calling 1-800-424-8802
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Incident Report # 101034

INCIDENT DESCRIPTION

xReport taken by: ENS DECKER at 12:05 on 28-DEC-91
Incident Type: VESSEL
Incident Cause: OPERATOR ERROR
Affected Area:
The incident occurred on 28-DEC-91 at 02:15 local time.
Affected Medium: WATER WILLIAMETTE RIVER

SUSPECTED RESPONSIBLE PARTY	
Name:	UNKNOWN
Organization:	M/V TAI CHUNG
Address:	TAIWAN NAVIG. LTD >
	7 FLOOR NO.17 >
HSU CHUNG ST	
	TAIPAI, TAIWAN ROC, XX

Type of Organization: PRIVATE ENTERPRISE

INCIDENT LOCATION	
COLUMBIA ALUMINUM CO	County: MULTNOMAH
MILE 10	
WILLAMETTE RIVER	
City: PORTLAND	State: OR

RELEASED MATERIAL(S)	
CHRIS Code: OTH	Official Material Name: OTHER OIL
Also Known As: INTERMEDIATE FUEL OIL	
Qty Released: 3000 GALLON(S)	Qty in Water: 3000 GALLON(S)

DESCRIPTION OF INCIDENT	
FUELING FROM BARGE / NO.4 TANK ON M/V TAI CHUNG BURPED	

INCIDENT DETAILS	
Platform Rig Name:	
Platform Letter:	
Location Area ID:	
Location Block ID:	
OCSG Number:	
OOSP Number:	
State Lease Number:	
Pier Dock Number:	
Berth Slip Number:	

---VESSEL INFORMATION---

Name: UNKNOWN NAME1 Number: M/V TAI CHUNG Aground: NO
Flag:
Length: Breadth: Draught:
Type: UNKNOWN
Hull Construction:
Fuel Capacity:

Fuel on Board:
Cargo Capacity:
Cargo on Board:

DAMAGES

Fire Involved: NO Fire Extinguished: UNKNOWN
INJURIES: Hospitalized: Empl/Crew: Passenger:
FATALITIES: Empl/Crew: Passenger: Occupant:
EVACUATIONS: Who Evacuated: Radius/Area:
Damages:

Closure Type	Description of Closure	Hours Closed	Direction of Closure
Air:	N		
Road:	N		Major N Artery:
Waterway:	N		
Track:	N		

Media Interest: Community Impact due to Material: NO

REMEDIAL ACTIONS

CONTRACTORS ON SCENE; BOOMS DEPLOYED MILE MARKER 11 AND 5 SHEEN
PATCHES; SOME RECOVERABLE
Release Secured: UNKNOWN
Release Rate:
Estimated Release Duration:

WEATHER

ADDITIONAL AGENCIES NOTIFIED

Federal:
State/Local:
State/Local On Scene:
State Agency Number:

NOTIFICATIONS BY NRC

NATIONAL RESPONSE CENTER HQ ME
15-OCT-03 18:06
MSO PORTLAND, OR
28-DEC-91 12:11

ADDITIONAL INFORMATION

CG OVERFLIGHT IN PROGRESS

*** END INCIDENT REPORT 101034 ***

Report any problems or Fax number changes by calling 1-800-424-8802
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Incident Report # 92484

INCIDENT DESCRIPTION

xReport taken by: MST3 WIKER at 16:14 on 16-OCT-91
Incident Type: VESSEL
Incident Cause: EQUIPMENT FAILURE
Affected Area:
The incident was discovered on 09-OCT-91 at 12:45 local time.
Affected Medium: WATER WILLAMETTE RIVER

SUSPECTED RESPONSIBLE PARTY

Name: UNKNOWN
Organization: USNS HASSAYAMPA
XX

Type of Organization: FEDERAL GOVERNMENT

INCIDENT LOCATION

WILLAMETTE RIVER County: UNKNOWN
MILE MARKER 8.2
City: PORTLAND State: OR
Latitude: 45 Degrees 34' 1" N
Longitude: 122 Degrees 43' 1" W

RELEASED MATERIAL(S)

CHRIS Code: GAV Official Material Name: GASOLINE: AVIATION (4.86G PB/GAL)
Also Known As:
Qty Released: 5 GALLON(S) Qty in Water: 5 GALLON(S)

DESCRIPTION OF INCIDENT

USNS HASSAYAMPA / LEAKING DUE TO STRUCTURAL FAILURE OF HULL DUE
TO CRACKS IN FUEL TANK

INCIDENT DETAILS

Platform Rig Name:
Platform Letter:
Location Area ID:
Location Block ID:
OCSG Number:
OCSP Number:
State Lease Number:
Pier Dock Number:
Berth Slip Number:

---VESSEL INFORMATION---

Name: UNKNOWN NAME1 Number: USNS HASSAYAMPA Aground: NO
Flag:
Length: Breadth: Draught:
Type: UNKNOWN
Hull Construction:
Fuel Capacity:
Fuel on Board:
Cargo Capacity:

Cargo on Board:

DAMAGES

Fire Involved: NO Fire Extinguished: UNKNOWN

INJURIES: Hospitalized: Empl/Crew: Passenger:

FATALITIES: Empl/Crew: Passenger: Occupant:

EVACUATIONS: Who Evacuated: Radius/Area:

Damages:

Closure Type	Description of Closure	Hours Closed	Direction of Closure
Air:	N		
Road:	N		Major N Artery:
Waterway:	N		
Track:	N		

Media Interest: Community Impact due to Material: NO

REMEDIAL ACTIONS

NONE, DISSIPATED.

Release Secured: UNKNOWN

Release Rate:

Estimated Release Duration:

WEATHER

ADDITIONAL AGENCIES NOTIFIED

Federal:

State/Local:

State/Local On Scene:

State Agency Number:

NOTIFICATIONS BY NRC

NATIONAL RESPONSE CENTER HQ ME

15-OCT-03 18:07

MSO PORTLAND, OR

16-OCT-91 16:19

ADDITIONAL INFORMATION

MSIS MP91010807

*** END INCIDENT REPORT 92484 ***

Report any problems or Fax number changes by calling 1-800-424-8802

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Incident Report # 199227

INCIDENT DESCRIPTION

xReport taken by: MST3 LLOYD at 16:24 on 23-SEP-93
Incident Type: VESSEL
Incident Cause: EQUIPMENT FAILURE
Affected Area:
The incident occurred on 23-SEP-93 at 13:20 local time.
Affected Medium: WATER WILLIAMETTE RIVER

SUSPECTED RESPONSIBLE PARTY

Name: LINDA WELLS
Organization: BRIX MARITIME
Address: 9030 NW ST HELENS
PORTLAND, OR 97267
PRIMARY Phone: (503)2860631 SECONDARY Phone: (503)3256621
Type of Organization: PRIVATE ENTERPRISE

INCIDENT LOCATION

9030 NW ST HELENS County: MULTNOMAH
City: PORTLAND State: OR Zip: 97267

RELEASED MATERIAL(S)

CHRIS Code: OWA Official Material Name: WASTE OIL
Also Known As:
Qty Released: 1 GALLON(S) Qty in Water: 1 GALLON(S)

DESCRIPTION OF INCIDENT

TUG BOAT T. J. BRIX / HOSE LEAKED WHILE OFFLOADING WASTE OILSHEEN
SIZE: UNKNOWN / BLUE-GRAY

INCIDENT DETAILS

Platform Rig Name:
Platform Letter:
Location Area ID:
Location Block ID:
OCSG Number:
OCSP Number:
State Lease Number:
Pier Dock Number:
Berth Slip Number:

---VESSEL INFORMATION---

Name: UNKNOWN NAME1 Number: UNKNOWN Aground: NO
Flag:
Length: Breadth: Draught:
Type: UNKNOWN
Hull Construction:
Fuel Capacity:
Fuel on Board:
Cargo Capacity:
Cargo on Board:

DAMAGES

Fire Involved: NO Fire Extinguished: UNKNOWN

INJURIES: Hospitalized: Empl/Crew: Passenger:

FATALITIES: Empl/Crew: Passenger: Occupant:

EVACUATIONS: Who Evacuated: Radius/Area:

Damages:

Closure Type	Description of Closure	Hours Closed	Direction of Closure
Air:	N		
Road:	N		Major N Artery:
Waterway:	N		
Track:	N		

Media Interest: Community Impact due to Material: NO

REMEDIAL ACTIONS

RECOVERED MATERIAL WITH PADS

Release Secured: UNKNOWN

Release Rate:

Estimated Release Duration:

WEATHER

ADDITIONAL AGENCIES NOTIFIED

Federal:

State/Local:

State/Local On Scene:

State Agency Number:

NOTIFICATIONS BY NRC

NATIONAL RESPONSE CENTER HQ ME

15-OCT-03 18:04

MSO PORTLAND, OR

PO STEVENSON

23-SEP-93 16:29

ADDITIONAL INFORMATION

WILL NOTIFY LOCAL CG AND STATE AUTHORITIES

*** END INCIDENT REPORT 199227 ***

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Incident Report # 644068

INCIDENT DESCRIPTION

*Report taken by: CIV THREATT at 14:22 on 05-MAY-03
Incident Type: VESSEL
Incident Cause: EQUIPMENT FAILURE
Affected Area: WILLIAMETTE RIVER
The incident was discovered on 25-APR-03 at 07:15 local time.
Affected Medium: WATER WILLIAMETTE RIVER

SUSPECTED RESPONSIBLE PARTY

Name: JOEL DERBYSHIRE
Address: JANTZEN BEACH MOORAGE
PORTLAND, OR

INCIDENT LOCATION

County: MULTNOMAH
City: PORTLAND State: OR
INCIDENT TOOK PLACE AT JANTZEN BEACH MOORAGE, MOORAGE #7

RELEASED MATERIAL(S)

CHRIS Code: GAS Official Material Name: GASOLINE: AUTOMOTIVE (UNLEADED)
Also Known As:
Qty Released: 1 GALLON(S) Qty in Water: 0 UNKNOWN AMOUNT
CHRIS Code: OLB Official Material Name: OIL, MISC: LUBRICATING
Also Known As:
Qty Released: 4 GALLON(S) Qty in Water: 0 UNKNOWN AMOUNT

DESCRIPTION OF INCIDENT

20 FT. BAYLINER CAPSIZED @ THE JANTZEN BEACH MOORAGE. THE SPILL
CLEANED UP WAS BY THE RP AND THE VESSEL WAS REMOVED FROM THE WATER.
APPROX 5 GALS OF MIXED OIL ENTERED THE WILLIAMETTE RIVER. AN LOW
WAS ISSUED.

INCIDENT DETAILS

Platform Rig Name:
Platform Letter:
Location Area ID:
Location Block ID:
OCSG Number:
OCSP Number:
State Lease Number:
Pier Dock Number:
Berth Slip Number:
---SHEEN INFORMATION---
Sheen Color: SILVERY
Sheen Odor Description: STRONG GASOLINE SMELL
Sheen Travel Direction: E
Sheen Size Length: 5 FEET
Sheen Size Width: 10 FEET
---WATER INFORMATION---
Body of Water: WILLIAMETTE RIVER

Tributary of:
Nearest River Mile Marker:
Water Supply Contaminated: NO

---VESSEL INFORMATION---

Name: OR370AX Number: Aground: YES
Flag:
Length: Breadth: Draught:
Type: PLEASURE CRAFT
Hull Construction:
Fuel Capacity:
Fuel on Board:
Cargo Capacity:
Cargo on Board:

DAMAGES

Fire Involved: NO Fire Extinguished: UNKNOWN
INJURIES: Hospitalized: Empl/Crew: Passenger:
FATALITIES: Empl/Crew: Passenger: Occupant:
EVACUATIONS: Who Evacuated: Radius/Area:
Damages:

Closure Type	Description of Closure	Hours Closed	Direction of Closure
Air:	N		
Road:	N		Major N Artery:
Waterway:	N		
Track:	N		

Media Interest: NONE Community Impact due to Material: NO

REMEDIAL ACTIONS

OIL WAS CONTAINED, REMOVED AND VESSEL WAS TAKEN OUT OF THE WATER AS TO POSE NO FURTHER THREAT
Release Secured: UNKNOWN
Release Rate:
Estimated Release Duration:

WEATHER

Weather: SUNNY, 65:F Wind speed: 3 MPH

ADDITIONAL AGENCIES NOTIFIED

Federal: USCG
State/Local: DEQ
State/Local On Scene: FIRE DEPT
State Agency Number: NO REPORT #

NOTIFICATIONS BY NRC

ATSDR OR ATTN: THEODORA TSONGAS
05-MAY-03 14:33 (503)7314025
ATSDR WA ATTN: LINDA GUNNELLS
05-MAY-03 14:33 (360)2363387
NOAA 1ST CLASS BB RPTS FOR OR
05-MAY-03 14:33 (206)5266344

NATIONAL RESPONSE CENTER HQ	ME
15-OCT-03 17:59	
MSO PORTLAND, OR	SMITH
05-MAY-03 14:36	(503)2409379
OREGON EMERGENCY MANAGEMENT	
05-MAY-03 14:33	(800)4520311
WA STATE EMERGENCY MANAGEMENT	
05-MAY-03 14:33	(800)2585990

ADDITIONAL INFORMATION

THIS REPORT HAS BEEN SUBMITTED BY PORTLAND, OR. MSO. POC MST1
MACK.

*** END INCIDENT REPORT 644068 ***

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Incident Report # 633984

INCIDENT DESCRIPTION

xReport taken by: CIV HALL at 14:43 on 13-JAN-03
Incident Type: FIXED
Incident Cause: OTHER
Affected Area: WILLIAMETTE RIVER
The incident was discovered on 13-JAN-03 at 10:55 local time.
Affected Medium: WATER WILLIAMETTE RIVER

SUSPECTED RESPONSIBLE PARTY

Name: BRENDA DONOVAN
Organization: ARCO PRODUCTS
Address: 9930 NW ST HELEN ROAD
PORTLAND, OR 97231
PRIMARY Phone: (503)2868257
Type of Organization: PRIVATE ENTERPRISE

INCIDENT LOCATION

9930 NW ST HELEN ROAD County: MULTNOMAH
City: PORTLAND State: OR Zip: 97231

RELEASED MATERIAL(S)

CHRIS Code: ODS Official Material Name: OIL: DIESEL
Also Known As:
Qty Released: 5 GALLON(S) Qty in Water: 5 GALLON(S)

DESCRIPTION OF INCIDENT

THE MATERIAL RELEASED FROM A SEA WALL DUE TO NORMAL OPERATIONS.

INCIDENT DETAILS

Building ID:
Type of Fixed Object: OTHER
Power Generating Facility: NO
Generating Capacity:
Type of Fuel:
NPDES:
NPDES Compliance: UNKNOWN
---SHEEN INFORMATION---
Sheen Color: RAINBOW
Sheen Odor Description:
Sheen Travel Direction:
Sheen Size Length: 200 FEET
Sheen Size Width: 100 FEET
---WATER INFORMATION---
Body of Water: WILLIAMETTE RIVER
Tributary of: COLUMBIA RIVER
Nearest River Mile Marker:
Water Supply Contaminated: NO

DAMAGES

Fire Involved: NO Fire Extinguished: UNKNOWN
INJURIES: Hospitalized: Empl/Crew: Passenger:
FATALITIES: Empl/Crew: Passenger: Occupant:
EVACUATIONS: Who Evacuated: Radius/Area:
Damages:

Closure Type	Description of Closure	Hours Closed	Direction of Closure
Air:	N		
Road:	N		Major N Artery:
Waterway:	N		
Track:	N		

Media Interest: NONE Community Impact due to Material: NO

REMEDIAL ACTIONS

CLEAN UP UNDERWAY
Release Secured: YES
Release Rate:
Estimated Release Duration:

WEATHER

Weather: CLEAR, :F

ADDITIONAL AGENCIES NOTIFIED

Federal:
State/Local:
State/Local On Scene:
State Agency Number:

NOTIFICATIONS BY NRC

ATSDR OR ATTN: THEODORA TSONGAS	
13-JAN-03 14:50	(503)7314025
ATSDR WA ATTN: LINDA GUNNELLS	
13-JAN-03 14:50	(360)2363387
NOAA 1ST CLASS BB RPTS FOR OR	
13-JAN-03 14:50	(206)5266344
MSO PORTLAND, OR	TOWNSEN
13-JAN-03 16:21	(503)2409379
OREGON EMERGENCY MANAGEMENT	
13-JAN-03 14:50	(800)4520311
WA STATE EMERGENCY MANAGEMENT	
13-JAN-03 14:50	(800)2585990

ADDITIONAL INFORMATION

THE CALLER HAD ADDITIONAL INFORMATION.

*** END INCIDENT REPORT 633984 ***

Report any problems or Fax number changes by calling 1-800-424-8802
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Incident Report # 549281

INCIDENT DESCRIPTION

xReport taken by: CIV JONES at 13:45 on 27-NOV-00
Incident Type: FIXED
Incident Cause: UNKNOWN
Affected Area: WILLAMETTE RIVER
The incident occurred on 27-NOV-00 at 10:15 local time.
Affected Medium: WATER WILLIAMETTE RIVER

SUSPECTED RESPONSIBLE PARTY

Name: MARVIN SMITH
Organization: FRED DIVINE DIVING & SAL
Address: 6211 NORTH ENGIN
PORTLAND, OR 97217
PRIMARY Phone: (503)2835285
Type of Organization: PRIVATE ENTERPRISE

INCIDENT LOCATION

County: MULTNOMAH
City: PORTLAND State: OR
PORT OF PORTLAND SHIPYARD DRY DOCK 1

RELEASED MATERIAL(S)

CHRIS Code: OTH Official Material Name: OTHER OIL
Also Known As: OTHER OIL / MOBILE L EAL 224H
Qty Released: 3 GALLON(S) Qty in Water: 2 CUP(S)

DESCRIPTION OF INCIDENT

THE CALLER STATED THAT A HOSE BETWEEN A HYDRAULIC UNIT AND A PUMP
BURST AND CAUSED OIL TO SPILL. THE CAUSE IS UNKNOWN.

INCIDENT DETAILS

Building ID:
Type of Fixed Object: OTHER
Power Generating Facility: NO
Generating Capacity:
Type of Fuel:
NPDES:
NPDES Compliance: UNKNOWN
---SHEEN INFORMATION---
Sheen Color: UNKNOWN
Sheen Odor Description:
Sheen Travel Direction:
Sheen Size Length: 30 FEET
Sheen Size Width: 30 FEET
---WATER INFORMATION---
Body of Water: WILLAMETTE RIVER
Tributary of: COLUMBIA RIVER
Nearest River Mile Marker:
Water Supply Contaminated: NO

DAMAGES

Fire Involved: NO Fire Extinguished: UNKNOWN
INJURIES: Hospitalized: Empl/Crew: Passenger:
FATALITIES: Empl/Crew: Passenger: Occupant:
EVACUATIONS: Who Evacuated: Radius/Area:
Damages:

Closure Type	Description of Closure	Hours Closed	Direction of Closure
Air:	N		
Road:	N		Major N Artery:
Waterway:	N		
Track:	N		

Media Interest: NONE Community Impact due to Material: NO

REMEDIAL ACTIONS

PORTION OF THE SPILL ON LAND HAS BEEN CONTAINED AND CLEANED UP. /
THE PORTION IN THE WATER HAS DISSIPATED.
Release Secured: YES
Release Rate:
Estimated Release Duration:

WEATHER

Weather: SUNNY, 48:F

ADDITIONAL AGENCIES NOTIFIED

Federal: MSO PORTLAND
State/Local:
State/Local On Scene:
State Agency Number:

NOTIFICATIONS BY NRC

ATSDR OR ATTN: RICK LEIKER	
27-NOV-00 13:54	(503)7314025
ATSDR WA ATTN: LUCY HARTER	
27-NOV-00 13:54	(360)2363364
U.S. EPA X SEATTLE	MR. RODIN
27-NOV-00 13:56	(206)5531263
NOAA 1ST CLASS BB RPTS FOR OR	
27-NOV-00 13:54	(206)5266344
MSO PORTLAND, OR	MR. WESCHREK
27-NOV-00 13:55	(503)2409379
OREGON EMERGENCY MANAGEMENT	
27-NOV-00 13:54	(800)4520311
WA STATE EMERGENCY MANAGEMENT	
27-NOV-00 13:54	(800)2585990

ADDITIONAL INFORMATION

THE CALLER HAD NO ADDITIONAL INFORMATION

*** END INCIDENT REPORT 549281 ***

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Incident Report # 508698

INCIDENT DESCRIPTION

*Report taken by: LT UTTING at 17:39 on 11-DEC-99
Incident Type: VESSEL
Incident Cause: UNKNOWN
Affected Area:
The incident was discovered on 11-DEC-99 at 14:20 local time.
Affected Medium: WATER WILLIAMETTE RIVER

SUSPECTED RESPONSIBLE PARTY

Name: RALPH SIEGRIST
Organization: FOSS MARITIME
Address: 9030 NW ST HELENS ROAD
PORTLAND, OR 97267
PRIMARY Phone: (503)2860631 ALTERNATE Phone: (503)3256621
Type of Organization: PRIVATE ENTERPRISE

INCIDENT LOCATION

TOSCO OIL DOCK County: MULTNOMAH
City: PORTLAND State: OR

RELEASED MATERIAL(S)

CHRIS Code: OTD Official Material Name: OIL, FUEL: NO. 2-D
Also Known As:
Qty Released: 17 GALLON(S) Qty in Water: 17 GALLONS

DESCRIPTION OF INCIDENT

REFUELING TUG AT DOCK / UNKNOWN

INCIDENT DETAILS

Platform Rig Name:
Platform Letter:
Location Area ID:
Location Block ID:
OCSG Number:
OCSP Number:
State Lease Number:
Pier Dock Number:
Berth Slip Number:

---VESSEL INFORMATION---

Name: UNKNOWN NAME1 Number: HOWARD OLSEN/566412 Aground: NO
Flag:
Length: Breadth: Draught:
Type: UNKNOWN
Hull Construction:
Fuel Capacity:
Fuel on Board:
Cargo Capacity:
Cargo on Board:

DAMAGES

Fire Involved: NO Fire Extinguished: UNKNOWN
INJURIES: Hospitalized: Empl/Crew: Passenger:
FATALITIES: Empl/Crew: Passenger: Occupant:
EVACUATIONS: Who Evacuated: Radius/Area:
Damages:

Closure Type	Description of Closure	Hours Closed	Direction of Closure
Air:	N		
Road:	N		Major N Artery:
Waterway:	N		
Track:	N		

Media Interest: Community Impact due to Material: NO

REMEDIAL ACTIONS

SECURED / BOOM IN PLACE / ABSORBENT PADS / FEIS CALLED ENR
Release Secured: UNKNOWN
Release Rate:
Estimated Release Duration:

WEATHER

ADDITIONAL AGENCIES NOTIFIED

Federal:
State/Local:
State/Local On Scene:
State Agency Number:

NOTIFICATIONS BY NRC

ATSDR OR ATTN: RICK LEIKER	
11-DEC-99 00:00	(503)7314798
ATSDR WA ATTN: LUCY HARTER	
11-DEC-99 00:00	(360)2362257
NOAA 1ST CLASS BB RPTS FOR OR	
11-DEC-99 00:00	(202)5266329
MSO PORTLAND, OR	PO BRATCHER
11-DEC-99 17:49	
OREGON EMERGENCY MANAGEMENT	
11-DEC-99 00:00	(503)5881378
WA STATE EMERGENCY MANAGEMENT	
11-DEC-99 00:00	(253)5127287

ADDITIONAL INFORMATION

WX OVERCAST / 45F / WILL NOTIFY OREGON REPNSE

*** END INCIDENT REPORT 508698 ***

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Incident Report # 470026

INCIDENT DESCRIPTION

xReport taken by: CIV REDDY at 14:11 on 08-JAN-99
Incident Type: VESSEL
Incident Cause: OPERATOR ERROR
Affected Area:
The incident occurred on 08-JAN-99 at 11:00 local time.
Affected Medium: WATER WILLAMETTE RIVER

SUSPECTED RESPONSIBLE PARTY

Name: DENNIS FORSBERG
Organization: MARK MARINE
Address: UNKNOWN
VANCOUVER, WA
PRIMARY Phone: (360)6905753 SECONDARY Phone: (800)7746275
Type of Organization: PRIVATE ENTERPRISE

INCIDENT LOCATION

5480 NORTHWEST FRONT AVE County: MULTNOMAH
City: PORTLAND State: OR Zip: 97210

RELEASED MATERIAL(S)

CHRIS Code: OLB Official Material Name: OIL, MISC: LUBRICATING
Also Known As:
Qty Released: 1.5 GALLON(S) Qty in Water: 1.5 GALLON(S)

DESCRIPTION OF INCIDENT

TUG "UN-NAME" / DECKHAND CARRYING BUCKET TRIPPED / RELEASED BUCKET
OF LUBE OIL INTO WILLAMETTE RIVER

INCIDENT DETAILS

Platform Rig Name:
Platform Letter:
Location Area ID:
Location Block ID:
OCSG Number:
QCSP Number:
State Lease Number:
Pier Dock Number:
Berth Slip Number:

---VESSEL INFORMATION---

Name: UNKNOWN NAME1 Number: UNK Aground: NO
Flag:
Length: Breadth: Draught:
Type: UNKNOWN
Hull Construction:
Fuel Capacity:
Fuel on Board:
Cargo Capacity:
Cargo on Board:

DAMAGES

Fire Involved: NO Fire Extinguished: UNKNOWN

INJURIES: Hospitalized: Empl/Crew: Passenger:

FATALITIES: Empl/Crew: Passenger: Occupant:

EVACUATIONS: Who Evacuated: Radius/Area:

Damages:

Closure Type	Description of Closure	Hours Closed	Direction of Closure
Air:	N		
Road:	N		Major N Artery:
Waterway:	N		
Track:	N		

Media Interest: Community Impact due to Material: NO

REMEDIAL ACTIONS

DECKHAND SCOOPED MOST OF OIL / SPILL CONTAINED WITH ABSORBENT PADS /

Release Secured: UNKNOWN

Release Rate:

Estimated Release Duration:

WEATHER

ADDITIONAL AGENCIES NOTIFIED

Federal:

State/Local:

State/Local On Scene:

State Agency Number:

NOTIFICATIONS BY NRC

ATSDR OR ATTN: ELIZABETH ESSEKS	
08-JAN-99 00:00	(503) 4944278
ATSDR WA ATTN: LUCY HARTER	
08-JAN-99 00:00	(360) 2362257
NOAA 1ST CLASS BB RPTS FOR OR	
08-JAN-99 00:00	(202) 5266329
MSO PORTLAND, OR	PO BRATCHER
08-JAN-99 14:21	
OREGON EMERGENCY MANAGEMENT	
08-JAN-99 00:00	(503) 5881378
WA STATE EMERGENCY MANAGEMENT	
08-JAN-99 00:00	(253) 5127287

ADDITIONAL INFORMATIONSIZE: 60 X 30 FEET / COLOR: RAINBOW / TEMP: 40F / CLOUD COVER:
FOGWIND: CALM / CALLER WILL NOTIFY: OR RESPONSE CENTER / MSO
PORTLAND

*** END INCIDENT REPORT 470026 ***

10/15/03 18:05:13

(202) 267-6330->

NRCHQ-ME

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Incident Report # 599501

INCIDENT DESCRIPTION

*Report taken by: CIV EDWARDS at 15:39 on 13-APR-02
Incident Type: VESSEL
Incident Cause: UNKNOWN
Affected Area: WILLIAMETTE RIVER
The incident was discovered on 13-APR-02 at 11:40 local time.
Affected Medium: WATER WILLIAMETTE RIVER

SUSPECTED RESPONSIBLE PARTY

Name: LENN BECICKA
Organization: TRANSOCEANIC CABLE SHIP COMPANY
Address: 1001 MCCOMAS STREET
BALTIMORE, MD 21230
PRIMARY Phone: (410)7832200
Type of Organization: PRIVATE ENTERPRISE

INCIDENT LOCATION

County: CLACKAMAS
City: PORTLAND State: OR
CASCADE GENERAL SHIPYARD

RELEASED MATERIAL(S)

CHRIS Code: OUN Official Material Name: UNKNOWN OIL
Also Known As:
Qty Released: 2 LITER(S) Qty in Water: 2 LITER(S)

DESCRIPTION OF INCIDENT

CALLER REPORTING A RELEASE OF MATERIAL FROM A VESSEL DUE TO UNKNOWN
CAUSES.

INCIDENT DETAILS

Platform Rig Name:
Platform Letter:
Location Area ID:
Location Block ID:
OCSG Number:
QCSP Number:
State Lease Number:
Pier Dock Number: 304
Berth Slip Number:
---SHEEN INFORMATION---
Sheen Color: UNKNOWN
Sheen Odor Description:
Sheen Travel Direction:
Sheen Size Length:
Sheen Size Width:
---WATER INFORMATION---
Body of Water: WILLIAMETTE RIVER
Tributary of: COLUMBIA RIVER
Nearest River Mile Marker:
Water Supply Contaminated: NO

---VESSEL INFORMATION---

Name: TYCOM RELIANCE Number: V7CZ2 Aground: NO
Flag:
Length: 457 Breadth: 69 Draught: 28
Type: OTHER
Hull Construction: SINGLE HULL SINGLE LINING
Fuel Capacity: 25000 BARREL(S)
Fuel on Board: 0 UNKNOWN AMOUNT
Cargo Capacity:
Cargo on Board:

DAMAGES

Fire Involved: NO Fire Extinguished: UNKNOWN
INJURIES: Hospitalized: Empl/Crew: Passenger:
FATALITIES: Empl/Crew: Passenger: Occupant:
EVACUATIONS: Who Evacuated: Radius/Area:
Damages:

Closure Type	Description of Closure	Hours Closed	Direction of Closure
Air:	N		
Road:	N		Major N Artery:
Waterway:	N		
Track:	N		

Media Interest: NONE Community Impact due to Material: NO

REMEDIAL ACTIONS

BOOMS APPLIED, ABSORBENTS APPLIED, MATERIAL CONTAINED
Release Secured: YES
Release Rate:
Estimated Release Duration:

WEATHER

Weather: UNKNOWN, :F

ADDITIONAL AGENCIES NOTIFIED

Federal:
State/Local:
State/Local On Scene:
State Agency Number:

NOTIFICATIONS BY NRC

ATSDR OR ATTN: THEODORA TSONGAS
13-APR-02 15:51 (503) 7314025
NOAA 1ST CLASS BB RPTS FOR OR
13-APR-02 15:51 (206) 5266344
MSO PORTLAND, OR BURTLESON
13-APR-02 15:55 (503) 2409379
OREGON EMERGENCY MANAGEMENT
13-APR-02 15:51 (800) 4520311

ADDITIONAL INFORMATION

18/15/03 18:06:22

(202) 267-6330->

NRCHQ-ME

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CALLER PLANS TO CALL THE STATE OF OREGON. CALLER HAD NO SHEEN
INFORMATION.

*** END INCIDENT REPORT 599501 ***

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Incident Report # 113244

INCIDENT DESCRIPTION

*Report taken by: ENS DECKER at 06:06 on 07-APR-92
Incident Type: VESSEL
Incident Cause: UNKNOWN
Affected Area:
The incident occurred on 07-APR-92 at 02:35 local time.
Affected Medium: WATER WILLIAMETTE RIVER

SUSPECTED RESPONSIBLE PARTY

Name: UNKNOWN
Organization: VESSEL KEN SPANKER
XX

Type of Organization: UNKNOWN

INCIDENT LOCATION

PORT OF PORTLAND County: MULTNOMAH
TERMINAL 4
BERTH 411
City: PORTLAND State: OR Zip: 97223

RELEASED MATERIAL(S)

CHRIS Code: 0TH Official Material Name: OTHER OIL
Also Known As: BLACK OIL
Qty Released: 300 GALLON(S) Qty in Water: 0 NONE

DESCRIPTION OF INCIDENT

TRANSFERRING BLACK OIL / SPILL OCCURRED

INCIDENT DETAILS

Platform Rig Name:
Platform Letter:
Location Area ID:
Location Block ID:
QCSG Number:
QCSP Number:
State Lease Number:
Pier Dock Number:
Berth Slip Number:

---VESSEL INFORMATION---

Name: UNKNOWN NAME1 Number: UNKNOWN Aground: NO
Flag:
Length: Breadth: Draught:
Type: UNKNOWN
Hull Construction:
Fuel Capacity:
Fuel on Board:
Cargo Capacity:
Cargo on Board:

DAMAGES

Fire Involved: NO Fire Extinguished:

INJURIES: Hospitalized: Empl/Crew: Passenger:

FATALITIES: Empl/Crew: Passenger: Occupant:

EVACUATIONS: Who Evacuated: Radius/Area:

Damages:

Closure Type	Description of Closure	Hours Closed	Direction of Closure
Air:			

Road:	Major Artery:
-------	---------------

Waterway:

Track:

Media Interest: Community Impact due to Material:

REMEDIAL ACTIONS

SPILL CONTAINED ON VESSEL, CG ENROUTE

Release Secured:

Release Rate:

Estimated Release Duration:

WEATHER

ADDITIONAL AGENCIES NOTIFIED

Federal:

State/Local:

State/Local On Scene:

State Agency Number:

NOTIFICATIONS BY NRC

MSO PORTLAND, OR

07-APR-92 06:11

ADDITIONAL INFORMATION

*** END INCIDENT REPORT 113244 ***

Report any problems or Fax number changes by calling 1-800-424-8802

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Incident Report # 158614

INCIDENT DESCRIPTION

xReport taken by: MST3 WILKERSON at 11:18 on 18-FEB-93
Incident Type: UNKNOWN SHEEN
Incident Cause: UNKNOWN
Affected Area:
The incident occurred on 18-FEB-93 at 07:55 local time.
Affected Medium: WATER WILLAMETTE RIVER

SUSPECTED RESPONSIBLE PARTY

Name: UNKNOWN

XX

Type of Organization: UNKNOWN

INCIDENT LOCATION

WILLAMETTE RIVER County: MULTNOMAH
City: PORTLAND State: OR

RELEASED MATERIAL(S)

CHRIS Code: OUN Official Material Name: UNKNOWN OIL
Also Known As:
Qty Released: 0 UNKNOWN AMOUNT Qty in Water: 0 UNKNOWN AMOUNT

DESCRIPTION OF INCIDENT

UNKNOWN / UNKNOWN SHEEN SIGHTING SHEEN SIZE: 300FT X 100FT

INCIDENT DETAILS

Platform Rig Name:
Platform Letter:
Location Area ID:
Location Block ID:
OCSG Number:
OCSP Number:
State Lease Number:
Pier Dock Number:
Berth Slip Number:

DAMAGES

Fire Involved: NO Fire Extinguished:
INJURIES: Hospitalized: Empl/Crew: Passenger:
FATALITIES: Empl/Crew: Passenger: Occupant:
EVACUATIONS: Who Evacuated: Radius/Area:
Damages:

Closure Type	Description of Closure	Hours Closed	Direction of Closure
Air:			

Road:

Major
Artery:

Waterway:

Track:

Media Interest: Community Impact due to Material:

REMEDIAL ACTIONS

NONE

Release Secured:

Release Rate:

Estimated Release Duration:

WEATHER

ADDITIONAL AGENCIES NOTIFIED

Federal:

State/Local:

State/Local On Scene:

State Agency Number:

NOTIFICATIONS BY NRC

MSO PORTLAND, OR

18-FEB-93 11:21

ADDITIONAL INFORMATION

*** END INCIDENT REPORT 158614 ***

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Incident Report # 333560

INCIDENT DESCRIPTION

xReport taken by: MST3 RUTHERFORD at 17:40 on 27-MAR-96
Incident Type: VESSEL
Incident Cause: OTHER
Affected Area:
The incident occurred on 27-MAR-96 at 14:25 local time.
Affected Medium: WATER WILLIAMETTE RIVER

SUSPECTED RESPONSIBLE PARTY

Name: RON WORLEY
Organization: FOSS MARITIME
Address: 9030 NW ST HELENS
PORTLAND, OR 97267
PRIMARY Phone: (503)2860631 SECONDARY Phone: (503)3256621
Type of Organization: PRIVATE ENTERPRISE

INCIDENT LOCATION

TERMINAL 4 County: MULTNOMAH
BERTH 411
PORT OF PORTLAND
City: PORTLAND State: OR Zip: 97267

RELEASED MATERIAL(S)

CHRIS Code: OTD Official Material Name: OIL, FUEL: NO. 2-D
Also Known As:
Qty Released: 1 GALLON(S) Qty in Water: 1 GALLON(S)

DESCRIPTION OF INCIDENT

M/V ANSAC ASIA/DURING FUEL TRANSFER A FUEL TANK WAS OVER FILLED

INCIDENT DETAILS

Platform Rig Name:
Platform Letter:
Location Area ID:
Location Block ID:
OCSG Number:
OCSP Number:
State Lease Number:
Pier Dock Number:
Berth Slip Number:

---VESSEL INFORMATION---

Name: UNKNOWN NAME1 Number: UNKNOWN Aground: NO
Flag:
Length: Breadth: Draught:
Type: UNKNOWN
Hull Construction:
Fuel Capacity:
Fuel on Board:
Cargo Capacity:

Cargo on Board:

DAMAGES

Fire Involved: NO Fire Extinguished: UNKNOWN

INJURIES: Hospitalized: Empl/Crew: Passenger:

FATALITIES: Empl/Crew: Passenger: Occupant:

EVACUATIONS: Who Evacuated: Radius/Area:

Damages:

Closure Type	Description of Closure	Hours Closed	Direction of Closure
Air:	N		
Road:	N		Major N Artery:
Waterway:	N		
Track:	N		

Media Interest: Community Impact due to Material: NO

REMEDIAL ACTIONS

LEAK WAS SECURED/USED SORBENTS TO RECOVER

Release Secured: UNKNOWN

Release Rate:

Estimated Release Duration:

WEATHER

ADDITIONAL AGENCIES NOTIFIED

Federal:

State/Local:

State/Local On Scene:

State Agency Number:

NOTIFICATIONS BY NRC

ATSDR OR	ATTN: LINDA SAMET	?????
	27-MAR-96 00:00	(503)4944278
ATSDR WA	ATTN: LUCY HARTER	?????
	27-MAR-96 00:00	(360)5865529
MSO PORTLAND, OR		PO KJELDGAARD
	27-MAR-96 17:45	
NOAA RPTS RGN X	(1ST CLASS BB)	?????
	27-MAR-96 00:00	(202)2672165

ADDITIONAL INFORMATION

SHEEN SIZE:UNKNOWN/COLOR:RAINBOWWILL NOTIFY:RESPONSE SYSTEM

*** END INCIDENT REPORT 333560 ***

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Incident Report # 304430

INCIDENT DESCRIPTION

*Report taken by: MST3 FINKBEINER at 13:51 on 18-AUG-95
Incident Type: VESSEL
Incident Cause: UNKNOWN
Affected Area:
The incident was discovered on 18-AUG-95 at 06:00 local time.
Affected Medium: WATER WILLIAMETTE RIVER

SUSPECTED RESPONSIBLE PARTY

Name: UNKNOWN
Organization: B/V OCEAN CROWN
XX

Type of Organization: PRIVATE ENTERPRISE

INCIDENT LOCATION

800 N RIVER ST County: MULTNOMAH
City: PORTLAND State: OR Zip: 97227

RELEASED MATERIAL(S)

CHRIS Code: OUN Official Material Name: UNKNOWN OIL
Also Known As:
Qty Released: 40 GALLON(S) Qty in Water: 40 GALLON(S)

DESCRIPTION OF INCIDENT

B/V OCEAN CROWN / UNKNOWN / SHEEN SIZE: 40 FT X 300 FT

INCIDENT DETAILS

Platform Rig Name:
Platform Letter:
Location Area ID:
Location Block ID:
OCSG Number:
OCSP Number:
State Lease Number:
Pier Dock Number:
Berth Slip Number:

---VESSEL INFORMATION---

Name: UNKNOWN NAME1 Number: UNKNOWN Aground: NO
Flag:
Length: Breadth: Draught:
Type: UNKNOWN
Hull Construction:
Fuel Capacity:
Fuel on Board:
Cargo Capacity:
Cargo on Board:

DAMAGES

Fire Involved: NO Fire Extinguished:

INJURIES: Hospitalized: Empl/Crew: Passenger:

FATALITIES: Empl/Crew: Passenger: Occupant:

EVACUATIONS: Who Evacuated: Radius/Area:

Damages:

Closure Type	Description of Closure	Hours Closed	Direction of Closure
Air:	N		

Road:	N	Major Artery:
-------	---	---------------

Waterway:

Track:

Media Interest: Community Impact due to Material:

REMEDIAL ACTIONS

CG ON SCENE/BOOMS PLACED AROUND SHIP

Release Secured:

Release Rate:

Estimated Release Duration:

WEATHER

ADDITIONAL AGENCIES NOTIFIED

Federal:

State/Local:

State/Local On Scene:

State Agency Number:

NOTIFICATIONS BY NRC

ATSDR OR	ATTN: LINDA SAMET	?????
	18-AUG-95 00:00	(503)4944278
ATSDR WA	ATTN: LUCY HARTER	?????
	18-AUG-95 00:00	(206)5865529
MSO PORTLAND, OR		PO CALLISTER
	18-AUG-95 13:58	
NOAA RPTS RGN X	(1ST CLASS BB)	?????
	18-AUG-95 00:00	(202)2672165

ADDITIONAL INFORMATION

*** END INCIDENT REPORT 304430 ***

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Incident Report # 113280

INCIDENT DESCRIPTION

*Report taken by: MST2 BESH0AR at 10:27 on 07-APR-92
Incident Type: PIPELINE
Incident Cause: EQUIPMENT FAILURE
Affected Area:
The incident occurred on 07-APR-92 at 07:05 local time.
Affected Medium: WATER WILLIAMETTE RIVER

SUSPECTED RESPONSIBLE PARTY

Name: KURT BOESCH
Organization: CHEVRON
Address: 5460 NORTHWEST DONNE
PORTLAND, OR 97232
PRIMARY Phone: (503)2217866
Type of Organization: PRIVATE ENTERPRISE

INCIDENT LOCATION

5460 NORTHWEST DONNE County: MULTNOMAH
City: PORTLAND State: OR Zip: 97232

RELEASED MATERIAL(S)

CHRIS Code: GAT Official Material Name: GASOLINE: AUTOMOTIVE (4.236 PB/G
Also Known As:
Qty Released: 4.99 GALLON(S) Qty in Water: 4.99 GALLON(S)

DESCRIPTION OF INCIDENT

10" PIPELINE/RUPTURED DUE TO CORROSION

INCIDENT DETAILS

Pipeline Type: UNKNOWN
DOT Regulated: UNKNOWN
Pipeline Above/Below Ground: ABOVE
Exposed or Under Water: UNKNOWN
Pipeline Covered: UNKNOWN

DAMAGES

Fire Involved: NO Fire Extinguished: UNKNOWN
INJURIES: Hospitalized: Empl/Crew: Passenger:
FATALITIES: Empl/Crew: Passenger: Occupant:
EVACUATIONS: Who Evacuated: Radius/Area:
Damages:

Closure Type	Description of Closure	Hours Closed	Direction of Closure
Air:	N		
Road:	N		Major N Artery:

Waterway: N

Track: N

Media Interest: Community Impact due to Material: NO

REMEDIAL ACTIONS

NONE

Release Secured: UNKNOWN

Release Rate:

Estimated Release Duration:

WEATHER

ADDITIONAL AGENCIES NOTIFIED

Federal:

State/Local:

State/Local On Scene:

State Agency Number:

NOTIFICATIONS BY NRC

MSO PORTLAND, OR

07-APR-92 10:30

ADDITIONAL INFORMATION

SHEEN SIZE=30 YDS X 30 YDS, RAINBOW, WILL CALL DEQ

*** END INCIDENT REPORT 113280 ***

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Incident Report # 585866

INCIDENT DESCRIPTION

*Report taken by: CIV JONES at 13:38 on 13-NOV-01
Incident Type: VESSEL
Incident Cause: EQUIPMENT FAILURE
Affected Area: WILLAMETTE RIVER
The incident occurred on 13-NOV-01 at 09:00 local time.
Affected Medium: WATER WILLIAMETTE RIVER

SUSPECTED RESPONSIBLE PARTY

Name: CARL GRUELUNE
Organization: CHEVRON USA
Address: POB 6027
SAN RAMONE, CA 94583
PRIMARY Phone: (503)2217864
Type of Organization: PRIVATE ENTERPRISE

INCIDENT LOCATION

County: MULTNOMAH
City: PORTLAND State: OR
Latitude: 45 Degrees 34' " N
Longitude: 122 Degrees 44' " W
WILLBRIDGE TERMINAL / UPPER BERTH

RELEASED MATERIAL(S)

CHRIS Code: OTH Official Material Name: OTHER OIL
Also Known As: GAS TURBINE OIL
Qty Released: 1 CUP(S) Qty in Water: 1 CUP(S)

DESCRIPTION OF INCIDENT

THE CALLER STATED THAT A CONTROLLABLE PITCH PROPELLER'S BLADE IS
LEAKING.

INCIDENT DETAILS

Platform Rig Name:
Platform Letter:
Location Area ID:
Location Block ID:
OCSG Number:
OCSF Number:
State Lease Number:
Pier Dock Number:
Berth Slip Number:
---SHEEN INFORMATION---
Sheen Color: OTHER
Sheen Odor Description:
Sheen Travel Direction:
Sheen Size Length: 15 FEET
Sheen Size Width: 1 FEET
---WATER INFORMATION---
Body of Water: WILLAMETTE RIVER
Tributary of: COLUMBIA RIVER

Nearest River Mile Marker:
Water Supply Contaminated: NO

---VESSEL INFORMATION---

Name: CHEVRON COLORADO Number: 577358 Aground: NO
Flag: UNITED STATES OF AMERICA
Length: 651 Breadth: 96 Draught: 26
Type: TANKER
Hull Construction: STEEL HULL
Fuel Capacity: 1500 TON(S)
Fuel on Board: 0 UNKNOWN AMOUNT
Cargo Capacity: 265000 BARREL(S)
Cargo on Board:

DAMAGES

Fire Involved: NO Fire Extinguished: UNKNOWN
INJURIES: Hospitalized: Empl/Crew: Passenger:
FATALITIES: Empl/Crew: Passenger: Occupant:
EVACUATIONS: Who Evacuated: Radius/Area:
Damages:

Closure Type	Description of Closure	Hours Closed	Direction of Closure
Air:	N		
Road:	N		Major N Artery:
Waterway:	N		
Track:	N		

Media Interest: NONE Community Impact due to Material: NO

REMEDIAL ACTIONS

INVESTIGATING THE INCIDENT
Release Secured: NO
Release Rate:
Estimated Release Duration:

WEATHER

Weather: OVERCAST, :F

ADDITIONAL AGENCIES NOTIFIED

Federal: MSO PORTLAND
State/Local:
State/Local On Scene:
State Agency Number:

NOTIFICATIONS BY NRC

ATSDR OR ATTN: THEODORA TSONGAS	
13-NOV-01 13:47	(503)7314025
ATSDR WA ATTN: LUCY HARTER	
13-NOV-01 13:47	(360)2363364
FBI PORTLAND FIELD OFC	
13-NOV-01 13:47	(503)2244181
NOAA 1ST CLASS BB RPTS FOR OR	
13-NOV-01 13:47	(206)5266344

NATIONAL RESPONSE CENTER HQ	VANTRAN
21-NOV-01 13:02	
MSO PORTLAND, OR	PO HUMPHRIES
13-NOV-01 13:49	(503) 2409379
OREGON EMERGENCY MANAGEMENT	
13-NOV-01 13:47	(800) 4520311
WA STATE EMERGENCY MANAGEMENT	
13-NOV-01 13:47	(800) 2585990

ADDITIONAL INFORMATION
THE CALLER HAD NO ADDITIONAL INFORMATION

*** END INCIDENT REPORT 585866 ***
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Incident Report # 94105

INCIDENT DESCRIPTION

xReport taken by: MST3 WIKER at 12:50 on 28-OCT-91
Incident Type: VESSEL
Incident Cause: OTHER
Affected Area:
The incident was discovered on 24-OCT-91 at 11:30 local time.
Affected Medium: WATER WILLIAMETTE RIVER

SUSPECTED RESPONSIBLE PARTY

Name: UNKNOWN
Organization: USN-USN TITAN
XX

Type of Organization: PRIVATE ENTERPRISE

INCIDENT LOCATION

WILLIAMETTE RIVER County: UNKNOWN
MILE MARKER 8
City: PORTLAND State: OR

RELEASED MATERIAL(S)

CHRIS Code: WTO Official Material Name: WASTE OIL/LUBRICANTS - POSS. CON
Also Known As:
Qty Released: .99 OTHER Qty in Water: .99 OTHER

DESCRIPTION OF INCIDENT

USNS TITAN / WHILE SHIFTING BERTHS, RAIN RUN-OFF WASHED OIL OFF OF
THEDECK

INCIDENT DETAILS

Platform Rig Name:
Platform Letter:
Location Area ID:
Location Block ID:
OCSG Number:
OCSP Number:
State Lease Number:
Pier Dock Number:
Berth Slip Number:

---VESSEL INFORMATION---

Name: UNKNOWN NAME1 Number: UNKNOWN Aground: NO
Flag:
Length: Breadth: Draught:
Type: UNKNOWN
Hull Construction:
Fuel Capacity:
Fuel on Board:
Cargo Capacity:
Cargo on Board:

DAMAGES

Fire Involved: NO Fire Extinguished: UNKNOWN
INJURIES: Hospitalized: Empl/Crew: Passenger:

FATALITIES: Empl/Crew: Passenger: Occupant:
EVACUATIONS: Who Evacuated: Radius/Area:

Damages:

Closure Type	Description of Closure	Hours Closed	Direction of Closure
Air:	N		
Road:	N		Major N Artery:
Waterway:	N		
Track:	N		

Media Interest: Community Impact due to Material: NO

REMEDIAL ACTIONS

NONE
Release Secured: UNKNOWN
Release Rate:
Estimated Release Duration:

WEATHER

ADDITIONAL AGENCIES NOTIFIED

Federal:
State/Local:
State/Local On Scene:
State Agency Number:

NOTIFICATIONS BY NRC

MSO PORTLAND, OR
28-OCT-91 12:57

ADDITIONAL INFORMATION

MSIS MP91011329

*** END INCIDENT REPORT 94105 ***

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PORTLAND HARBOR RI/FS
PROGRAMMATIC WORK PLAN

April 23, 2004

Prepared for:

The Lower Willamette Group

Prepared by:

Integral Consulting, Inc.
Windward Environmental, L.L.C.
Kennedy/Jenks Consultants
Anchor Environmental, L.L.C.
Groundwater Solutions, Inc.

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ADCP	Acoustic Doppler Current Profiler
AINW	Archeological Investigations Northwest
AOC	Administrative Order on Consent
ARAR	Applicable or Relevant and Appropriate Requirement
AWQC	Ambient Water Quality Criteria
BCF	bioconcentration factor
BEHP	bis(2-ethylhexyl)phthalate
bgs	below ground surface
BMP	best management practice
BSAF	biota sediment accumulation factor
BTEX	benzene, toluene, ethylbenzene, xylenes
CAD	confined aquatic disposal
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CGF	coarse-grained flood deposits and upper Troutdale Formation
COC	chemical of concern
COI	chemical of interest
COPC	chemical of potential concern
cfs	cubic feet per second
CRBG	Columbia River Basalt Group
CRD	Columbia River Datum
CSM	conceptual site model
CSO	combined sewer overflow
DDD	dichloro-diphenyl-dichloroethane
DDE	dichloro-diphenyl-dichloroethene
DDT	dichloro-diphenyl-trichloroethane
DEA	David Evans and Associates
DEQ	Oregon Department of Environmental Quality
DNAPL	dense non-aqueous phase liquid
DO	dissolved oxygen
DQO	data quality objective
ECSI	Oregon Environmental Cleanup Site Inventory
EPA	U.S. Environmental Protection Agency
ERA	ecological risk assessment
EROD	ethoxyresorufin O-deethylase
ESA	Endangered Species Act
FFA	fill, fine-grained facies of flood deposits, and Recent alluvium
FSP	field sampling plan
GLISP	Guild's Lake Industrial Sanctuary Plan
GPS	global positioning system
GRA	general response action
HHRA	human health risk assessment
HPAH	high molecular weight polycyclic aromatic hydrocarbon
HSP	health and safety plan

ISA	initial study area
K _d	soil/water partitioning coefficient
K _{oc}	organic carbon partitioning coefficient
K _{ow}	octanol-water partitioning coefficient
LASAR	laboratory analytical storage and retrieval
LCRMA	Lower Columbia River Management Area
LNAPL	light non-aqueous phase liquid
LOAEL	lowest observed adverse effect level
LOEC	lowest observed effect concentration
LPAH	low molecular weight polycyclic aromatic hydrocarbon
LWG	Lower Willamette Group
LWR	lower Willamette River
µg/kg	microgram per kilogram
µg/L	microgram per liter
m	meter
mg/kg	milligram per kilogram
mg/L	milligram per liter
mya	million years ago
MOA	memorandum of agreement
MOU	memorandum of understanding
MS	matrix spike
MSD	matrix spike duplicate
MSL	mean sea level
MTCA	Washington Model Toxics Control Act
NPL	National Priorities List
NAPL	non-aqueous phase liquid
NAVD	North American Vertical Datum
NGVD	National Geodetic Vertical Datum
NOAEL	no observed adverse effect level
NOEC	no observed effect concentration
NPDES	National Pollutant Discharge Elimination System
NRC	National Response Center
NRDA	National Resource Damage Assessment
OSU	Oregon State University
OSWER	Office of Solid Waste and Emergency Response
ODHS	Oregon Department of Human Services
PACG	preliminary analytical concentration goal
PAH	polycyclic aromatic hydrocarbon
PBT	persistent, bioaccumulative toxin
PCB	polychlorinated biphenyl
PCP	pentachlorophenol
ppm	part per million
PRD	Portland River Datum
PRE	preliminary risk evaluation
PRG	preliminary remediation goal

PRP	potentially responsible party
PSEP	Puget Sound Estuary Program
QA/QC	quality assurance/quality control
QAPP	quality assurance project plan
RA	remedial action
RAO	remedial action objective
RCRA	Resource Conservation & Recovery Act
RD	remedial design
RI/FS	remedial investigation/feasibility study
RM	river mile
ROC	receptor of concern
ROD	Record of Decision
RPD	redox potential discontinuity
SAP	sampling analysis plan
SEA	Striplin Environmental Associates
SMA	sediment management area
SOW	Statement of Work
SPI	sediment-profile imaging
SPMD	semipermeable membrane device
SRM	Sandy River Mudstone
STA [®]	Sediment Trend Analysis [®]
STORET	EPA's Data Storage and Retrieval System
SVOC	semi-volatile organic compound
TBC	to be considered
TBT	tributyltin
TCDD	2,3,7,8-tetrachlorodibenzo- <i>p</i> -dioxin
TCDF	2,3,7,8-tetrachlorodibenzofuran
TM	technical memorandum
TMDL	total maximum daily load
TOC	total organic carbon
TPH	total petroleum hydrocarbons
TRV	toxicity reference value
UCL	upper confidence limit
USACE	U.S. Army Corps of Engineers
USGS	U.S. Geological Survey
VOC	volatile organic compound
WRDA	Water Resource Development Act

1.0 INTRODUCTION

This programmatic work plan describes the activities that will be undertaken by the Lower Willamette Group (LWG) as it develops and implements a remedial investigation and feasibility study (RI/FS) for the Portland Harbor Superfund Site (Site) in Portland, Oregon. The LWG is a group of Portland Harbor businesses and public agencies involved in the investigation and evaluation of ecological and human health risks at the Site. The Portland Harbor RI/FS Programmatic Work Plan (Work Plan) complies with the requirements of the Administrative Order on Consent (AOC) and Statement of Work (SOW) (EPA 2001a) between the LWG and the U.S. Environmental Protection Agency (EPA) for conducting the RI/FS.

As stated in the SOW, the purpose of the RI/FS is “to investigate the nature and extent of contamination for the in-water portion of the Site, to assess the potential risk to human health and the environment, to develop and evaluate potential remedial alternatives, and to recommend a preferred alternative” (EPA 2001a). A critical objective of the RI/FS will be to characterize the Site sufficiently to allow EPA to define site boundaries and select a remedy that is protective of the survival, growth, and reproduction of ecological receptors (e.g., benthic invertebrates, fish, shellfish, birds, and mammals, including those listed under the Endangered Species Act) and human receptors that may consume fish or shellfish or come in contact with sediments, surface water, or groundwater seeps from the Site.

The RI and FS will be conducted in an integrated fashion. Data needs for the RI and FS will be identified collectively, and results will be shared throughout the project such that the field investigation data, the outcome of the RI, and the associated risk assessments can support the development and evaluation of remedial alternatives. FS information that may affect the scope of the RI or risk assessments will also be incorporated into the RI approach. The RI/FS will initially focus on the stretch of the Willamette River from river mile (RM) 3.5 to RM 9.2 and adjacent areas logically associated with an evaluation of the in-water portion of this stretch of the river. This Work Plan refers to this initial study area as “the ISA.” The ISA does not define the Superfund Site; the boundaries of the Site will be determined upon issuance of a Record of Decision (ROD).

The RI/FS will be conducted in a manner that is consistent with the Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA (EPA 1988), EPA’s Data Quality Objectives planning process (EPA 2000a), and other applicable guidance. This Work Plan describes the overall tasks to be conducted during the RI/FS, and provides the underlying rationale and objectives for each task, the data uses and analysis methods, and the principles that are being used to define the detailed sample collection and analysis efforts. Details of the sampling (e.g., locations, sampling methods) and the analytical methods are provided in the field sampling plans (FSPs) and the quality assurance project plans (QAPPs). Together, the FSP and QAPP comprise the sampling and analysis plan, which, in accordance with EPA guidance, are attachments to the overall Work Plan. EPA has approved the

Round 1 QAPP for use in the project. FSPs and the QAPP for the next round of sampling are being prepared and will be attached to this Work Plan. The overall organization of the RI/FS is described in Section 1.3. Details of the RI/FS program approach are summarized in Section 6, and the details of the RI/FS tasks are presented in Sections 7 and 8.

This Work Plan presents the RI/FS approach anticipated for the Site. Because additional data may be generated during the RI/FS that impacts the current understanding of the Site, the methods and assumptions presented in this Work Plan may be refined to incorporate new information. Changes to the RI/FS approach presented in this Work Plan will be discussed with EPA and its partners and submitted as interim deliverables or addenda prior to implementation. Similarly, it is anticipated that several technical memoranda will be prepared to provide detailed project approaches for various components of the RI, risk assessments, and FS. These memoranda will be submitted to EPA and its partners for review and approval, in accordance with the Work Plan schedule. Any EPA approved interim deliverable, addenda, or technical memorandum will be incorporated into this Work Plan and become a substantive part of this Work Plan under the AOC.

1.1 PORTLAND HARBOR OVERVIEW

Portland Harbor is located along an 11.6-mile dredged reach of the lower Willamette River (LWR) in Portland, Oregon (Figure 1-1 and Map 1-1)¹. While the harbor area is heavily industrialized, it occurs within a region characterized by commercial, residential, recreational, and agricultural uses. Land use along the LWR in the harbor includes marine terminals, manufacturing, and other commercial operations as well as public facilities, parks, and open spaces. Map 1-2 illustrates land use zoning within the LWR, as well as waterfront land ownership.

Since the late 1800s, the Portland Harbor section of the LWR has been extensively modified to accommodate a vigorous shipping industry. Modifications include re-direction and channelization of the main river, draining seasonal and permanent wetlands in the lower floodplain, and relatively frequent dredging to maintain the navigation channel. Constructed structures, such as wharfs, piers, floating docks, and pilings, are especially common in the Portland Harbor where urbanization and industrialization are most prevalent. These structures are built largely to accommodate or support shipping traffic within the river and to stabilize the riverbanks for urban development. Riprap is the most common bank-stabilization measure. However, upland bulkheads and rubble piles are also used to stabilize the banks. Seawalls are used to control periodic flooding as most of the original wetlands

¹ In this Work Plan, the term "Portland Harbor" means the portion of the Willamette River containing the federal navigation channel, from RM 0 to RM 11.6. The terms "lower Willamette River" and "LWR" mean the portion of the Willamette River from Willamette Falls to its confluence with the Columbia River, or RM 0 to approximately RM 26.5.

bordering the Willamette in the Portland Harbor area have been filled. Constructed structures are clearly visible in the aerial photos provided in Maps 1-3a-n. Numerous municipal and private outfalls, including storm drains and combined sewer overflows, are located along both shores of the LWR in the metropolitan area.

A federal navigation channel, with an authorized depth of –40 feet, extends from the confluence of the LWR with the Columbia River to RM 11.6. Container and other commercial vessels regularly transit the river. Certain parts of the river require periodic maintenance dredging to keep the navigation channel at its authorized depth. In addition, the Port of Portland and other private entities periodically perform maintenance dredging to support access to dock and wharf facilities. Dredging activity has greatly altered the physical and ecological environment of the river in the harbor area.

While the ecological function of the LWR has been greatly modified by development, a number of species of invertebrates, fishes, birds, amphibians, and mammals, including some protected by the Endangered Species Act (ESA), use habitats that occur within and along the river. The river is also an important pathway for migration of anadromous fishes such as salmon and lamprey. Various recreational fisheries, including salmon, bass, sturgeon, crayfish, and others, use the LWR. A detailed description of ecological communities in the harbor is presented with the Ecological Risk Assessment Approach in Appendix B.

The long history of industrial and shipping activities in the Portland Harbor, as well as agricultural, industrial, and municipal activities upstream of the harbor, has contributed to chemical contamination of surface water and sediments in the LWR. Potential sources of chemical releases to the river are described in Section 3. As noted above, the primary purpose of this RI/FS is to characterize the effects of such chemicals on the environment in the LWR to the extent necessary to support risk management actions to protect human health and the environment.

1.2 NAVIGATIONAL CHANNEL AUTHORIZATION HISTORY

The LWR federal navigation project was first authorized in 1878 to deepen and maintain parts of the Columbia River and LWR with a 20-foot minimum depth. The channel for both rivers has been deepened at various intervals since that time. The navigation depth for both rivers was increased to 25 feet in 1899 and to 30 feet in 1912. Between 1930 and 1935, the navigation channel depth was again increased to 35 feet, and in 1962 the authorized depth was increased to 40 feet.

The current project authorization, as modified by Congress in 1962, encompasses 11.6 miles of the Willamette River below Portland and 103.5 miles of the Columbia River below Vancouver, Washington. Work on the authorized 40-foot-deep channel from Portland and Vancouver to the Pacific was completed in 1976. The Willamette

River channel, from the Broadway Bridge (RM 11.6) to the mouth (RM 0), varies in width from 600 to 1,900 feet.

1.3 SCOPE OF THE RI/FS

As stated in the SOW, the purpose of the RI/FS is “to investigate the nature and extent of contamination for the in-water portion of the Site, to assess the potential risk to human health and the environment, to develop and evaluate potential remedial alternatives, and to recommend a preferred alternative” (EPA 2001a). With respect to releases or threatened releases of any hazardous substances to the in-water portion of the Site, the RI/FS will specifically address the protection of human health, as well as survival, growth, and reproduction of the following ecological receptors:

- Benthic invertebrates
- Fish and shellfish
- Birds and mammals
- Species listed under the ESA.

In addition, the potential for risk to amphibians/reptiles will be evaluated.

Following completion of the RI/FS, EPA will prepare a ROD for the Site, which will define the site boundaries and potential cleanup areas and approaches. After the ROD is finalized, EPA will likely enter into a Consent Decree with one or more potentially responsible parties who will undertake remedial design (RD), remedial action (RA), and long-term monitoring of sediment management areas (SMAs) within the Site. Members of the LWG may or may not be signatories of the Consent Decree for the RD and RA.

The SOW identifies the ISA for the purpose of focusing sampling during implementation of the initial phase of the RI/FS. The ISA is defined as the lower Willamette River from RM 3.5 to 9.2, and adjacent areas logically associated with an evaluation of the in-water portion of this stretch of river (see Map 1-1). The actual boundaries of the Site will be determined through the RI/FS process and will be documented by EPA in one or more RODs when the final remedy is selected.

The SOW for the RI/FS (EPA 2001a) requires completion of a series of tasks:

- Task 1 – Shared Server
- Task 2 – Scoping
- Task 3 – Community Relations
- Task 4 – Dredging Coordination

Task 5 – Site Characterization

Task 6 – Treatability Studies

Task 7 – Development and Screening of Remedial Alternatives

Task 8 – Detailed Analysis of Remedial Alternatives.

This Work Plan completes the requirements of SOW Task 2 – Scoping, which is composed of the following subtasks:

Subtask 2a: Data Compilation/Site Background

Subtask 2b: Cultural Resources Analysis

Subtask 2c: Submission of Work Plans via the Stipulated Agreement

Subtask 2d: Data Review and RI Planning

- Preliminary Conceptual Site Model
- Preliminary Analytical Concentration Goals

Subtask 2e: Preliminary FS Planning Tasks

- Remedial Action Objectives Technical Memorandum
- Facility Siting Technical Memorandum
- Capping Material Evaluation

Subtask 2h: RI/FS Work Plan for the ISA.

The deliverables for subtasks 2a – 2e have been submitted under separate cover or are included in this Work Plan. The relationship of the RI to the remaining tasks is also summarized in Section 1.3.2. Subtask 2f (CERCLA/WRDA Integration and Coordination Plan) will be addressed outside the Work Plan process. The deliverable for subtask 2g (Early Actions Technical Memorandum) has been submitted to EPA as a part of earlier drafts of the Work Plan, and EPA has requested that it be removed from the Work Plan.

1.3.1 RI/FS Technical Approach

The RI/FS will be a multiyear program involving multiple rounds of data gathering and data evaluation as chemical distributions and the factors driving risks to ecological receptors and human health are identified. In concert with the RI field studies and data evaluations, data will be gathered to support the FS so that potential

remedial alternatives can begin to be considered and evaluated as the RI/FS process identifies and refines potential areas for cleanup.

Pursuant to the SOW requirements, the RI/FS technical approach is based on EPA guidance documents. Included in this guidance is the recent EPA memorandum, Principles for Managing Contaminated Sediment Risks at Hazardous Waste Sites [Office of Solid Waste and Emergency Response (OSWER) Directive 9285.6-08 (EPA 2002b)], which identifies 11 key concepts to be considered in the RI/FS process for the Site:

1. Control Sources Early.
2. Involve the Community Early and Often.
3. Coordinate with States, Local Governments, Tribes, and Natural Resource Trustees.
4. Develop and Refine a Conceptual Site Model that Considers Sediment Stability.
5. Use an Iterative Approach in a Risk-Based Framework.
6. Carefully Evaluate the Assumptions and Uncertainties Associated with Site Characterization Data and Site Models.
7. Select Site-specific, Project-specific, and Sediment-specific Risk Management Approaches that will Achieve Risk-based Goals.
8. Ensure that Sediment Cleanup Levels are Clearly Tied to Risk Management Goals.
9. Maximize the Effectiveness of Institutional Controls and Recognize their Limitations.
10. Design Remedies to Minimize Short-term Risks while Achieving Long-term Protection.
11. Monitor During and After Sediment Remediation to Assess and Document Remedy Effectiveness.

Consideration of this and other guidance documents, frequent communication with the agencies, and experience at other sites were utilized in designing this Work Plan. The resulting risk-based technical approach relies upon the initial use of existing data, the data quality objectives (DQO) process, iterative evaluation of data to guide subsequent activities, and identification of ongoing sources to focus the timely and efficient completion of the RI/FS. It is important to note that Oregon Department of Environmental Quality (DEQ) has the primary responsibility for identifying and directing control of upland sources to the Portland Harbor Superfund Site.

A flowchart depicting the generalized RI/FS process is shown in Figure 1-2. The technical approach is summarized in the following section and is described in detail in Section 6.

1.3.2 Overview of RI/FS Tasks

As shown in Figure 1-2, the RI/FS Work Plan builds upon information and evaluations developed as part of the Task 2 scoping effort, and lays out the “road map” for completion of the RI, baseline risk assessments, and FS. The steps in the RI/FS process shown in Figure 1-2 are coded with a number referenced in the following text (the text also provides the applicable SOW task/subtask number). Each step is discussed in detail in subsequent sections of the RI/FS Work Plan. These steps are briefly described below as an introduction to the overall process:

- 1. Compilation and Evaluation of Historical Data (Box 1 in Figure 1-2, SOW Subtask 2a).** The RI/FS was initiated with an extensive compilation of existing information, which is summarized within this Work Plan (primarily Sections 2, 3, and 4) and associated appendices (particularly Appendices B, C, D, E, and F). Nearly 700 documents and data sets were obtained that address conditions in the LWR. This information was used to develop an initial understanding of the physical, chemical, and biological processes at the site and to assist in the development of the conceptual site model for the ISA (Section 5) and identification of data gaps (Section 7). At EPA’s request, revisions to the preliminary conceptual site model presented in this Work Plan will be updated and resubmitted as a stand-alone report prior to development of the Round 2B sediment coring field sampling plan.
- 2. Phase 1 Studies (Box 2, SOW Subtask 2c).** Recognizing that critical new site-specific physical and biological information was necessary to begin scoping the Work Plan, the LWG performed the following four pre-AOC “Phase 1” field studies approved by EPA in a stipulated agreement (EPA 2001b):
 - Juvenile salmonid residence time field study (Ellis Ecological Services 2002)
 - Multibeam acoustic bathymetry survey from RM 0 to Ross Island (DEA 2002a)
 - Integration of a sediment trend analysis and an evaluation of historical bathymetry (SEA 2002b)
 - Sediment-profile imaging field study (SEA 2002f).

Reports documenting the results of these pre-AOC “Phase 1” studies have been provided to EPA.

- 3. RI Scoping Process (Box 3, SOW Subtask 2d and 2h).** During Work Plan development, the LWG and EPA undertook an extensive scoping process to allow a more focused approach to the RI/FS and associated risk assessments. In addition to developing and maintaining a high level of communication with the EPA Remedial Project Manager and staff, communication between the LWG, DEQ, Natural Resource Trustee agencies, and Tribes was a key element of the initial scoping. The LWG directed its consultant team to meet with EPA’s technical support staff to identify issues that will need to be addressed in the RI and risk assessments and to discuss various approaches for addressing those issues.

Historical data that were available to the LWG were compiled and reviewed for quality and utility in supporting the RI/FS and risk assessments. As part of the data review, DQOs for determining the usefulness of a given historical data set were developed and documented in a technical memorandum to EPA (SEA 2001b). Historical chemical data were compiled for use by all the parties in a relational database for easy retrieval, summarization, or transfer to geographic information systems and other software. Existing data are summarized in Section 4, and additional information is found in the Work Plan appendices described in more detail below.

A preliminary conceptual site model (CSM) was developed based on the current understanding of the physical and biological characteristics of the ISA. Data gaps that need to be filled during the RI/FS also were identified, including data needed for developing and evaluating remedial alternatives. The preliminary conceptual site model is found in Section 5 of this Work Plan.

A CSM will be developed that portrays the relationship among sources, chemicals, transport mechanisms (including sediment transport, surface runoff and groundwater discharges to the Site), receptors, and other parameters that are determined to be relevant.

A CSM will be submitted in accordance with the approved schedule. The purpose of the CSM is to:

1. Focus sampling.
2. Gain a better understanding of potential contaminant loadings from upland sources (including direct discharge, overland transport, groundwater and bank erosion) and the relative importance of the various transport mechanisms in different river miles.

3. Identify where there may be continuing sources of contamination and pathways to the river (including persistent bioaccumulative toxins) based on historical site use information, site information and analytical data.
4. Identify historical sources of contamination and pathways to the river.
5. Identify overwater activities that may have released contamination to the Willamette River sediments.
6. Identify areas of the river where recontamination of sediments by upland and other sources is a risk.
7. Gain insight regarding upland source control strategies and help DEQ identify where additional work must be done by responsible parties and DEQ on upland sites.

Updated versions of the CSM will be submitted in the future as additional data are evaluated and the CSM is refined. Data needed to complete the RI/FS are identified in Sections 7 and 8.

Preliminary analytical concentration goals were developed from risk-based screening levels and method reporting limits, and were used to assist in the development of the Round 1 Quality Assurance Project Plan (SEA 2002e) that was approved by EPA (2002a). A technical memorandum providing this information was initially submitted to EPA on January 25, 2002 (SEA 2002c); the memorandum was revised based on EPA comments and resubmitted on April 1, 2002 (Windward et al. 2002).

The Work Plan and companion documents (SOW Subtask 2g) compile the results of the RI/FS scoping process. Field sampling plans (i.e., sampling and analysis plans referenced in Section 4.9.1 of the SOW), and site health and safety plans have been submitted under separate cover.

- 4. FS Planning (Box 4, SOW Subtask 2e).** Prior to completion of this Work Plan, tasks to specifically assist in the planning of the FS were undertaken, including the development of preliminary remedial action objectives, methods for ensuring that capping material will meet remedial action objectives, and a process for siting a contaminated sediment disposal facility. These tasks are described in Appendix A.
- 5. Early Action Evaluation (Box 5, SOW Subtask 2g).** A draft technical memorandum on Early Actions was submitted to EPA in two earlier drafts of this Work Plan. EPA has directed that this memorandum be removed from the Work Plan, and it is not discussed further in this document.

Implementation of any Early Actions will occur by separate agreement with EPA rather than as part of the AOC for the RI/FS.

6. Remedial Investigation – Site Characterization (Box 6, SOW Task 5).

The RI will be implemented as an iterative process involving evaluation of risk, use of DQOs to identify data needs, field studies, and data evaluation. The steps taken to assess RI data needs are presented in Section 7. Results of this data evaluation process form the basis of the Round 2 field sampling plans, submitted under separate cover. Currently, four rounds of sampling (i.e., pre-AOC sampling/data and Rounds 1, 2, and 3), as described in Section 6, are anticipated, although the need for additional sampling rounds may be identified later. Consistent with EPA guidance, the goal of the RI is not to eliminate uncertainty, but to reduce it enough to allow sound risk management and remediation decisions.

For each round of field sampling plans, the DQO process will be used to identify specific decisions and the quality and quantity of data needed to make the decisions. Field sampling plan addenda may also be prepared that describe data collection needed to address the data needs during the same field season. Resulting data will then be analyzed to determine if risk is sufficiently well understood to allow decisions regarding risk management and remedial actions.

- 7. Baseline Risk Assessments (Box 7, SOW Task 5).** Draft baseline human health and ecological risk assessments will be prepared following the Round 3 data collection effort. The baseline risk assessments will be based on pre-AOC, Round 1, Round 2, Round 3, and historic Category 1 data, as well as other data agreed to by EPA and the LWG. Following Round 1, an ecological preliminary risk evaluation report will be prepared to help frame data gaps and information needs to complete the baseline ecological risk assessment. The approaches to the ecological and human health risk assessments based on the anticipated RI/FS process are summarized in Section 7 and provided in detail in Appendices B and C, respectively. If needed, modifications to the risk assessment methodologies and procedures presented in this Work Plan will be discussed with EPA and its partners and submitted as technical memoranda.

- 8. Feasibility Study (Box 8, SOW Tasks 6, 7, and 8).** The FS will be conducted from the beginning of the overall RI/FS process, as much of the data collected throughout the process (e.g., subsurface coring samples, water samples, sediment physical characteristics, and bathymetry) will be of significant value to the FS. In addition, some preliminary documents have been generated that are primarily concerned with FS-related tasks, including:

- Preliminary Remedial Action Objectives Technical Memorandum
- Disposal Facility Siting Evaluation Technical Memorandum
- Capping Material Evaluation Technical Memorandum
- Natural Attenuation Data Gaps Technical Memorandum.

These memos are provided in the detailed FS approach contained in Appendix A of this Work Plan. The last bullet, Natural Attenuation Data Gaps Technical Memorandum, identifies information needs for evaluating natural attenuation. This issue is addressed several times throughout this document because the Work Plan provides the basis for determining data needs and approaches to collecting those data.

Based on the methods described in the above memos and the requirements of the SOW, the following FS tasks will be conducted during the course of the RI:

- Facility siting evaluation
- Natural attenuation sampling and modeling (in several steps)
- Treatability study literature survey and needs determination
- Refinement of areas and volumes of sediment requiring remediation.

Development of this information in concert with the RI will allow the FS to proceed without delay once the RI and risk assessments have been completed. As the RI is proceeding, the volume and extent of sediments that appear to require remediation will be defined for the FS. As more definitive information is generated by the risk process, these sediment volumes and extents can be further refined and the process of developing remedial areas (i.e., SMAs) and developing remediation alternatives can begin. The development of the remediation alternatives will mark the formal beginning of the FS process and will likely start as the RI and baseline risk assessments are being completed. Areas of localized risk and site-wide risk will be considered in the FS.

There will continue to be considerable interaction between the risk assessors and the FS team during the determination of SMAs and during the evaluation of potential remedial alternatives as the risk team evaluates the risk reductions associated with the various remedial alternatives. Once a set of potential remedial alternatives has been developed for each SMA, the FS will follow CERCLA guidance and evaluate the set of remedial alternatives against the nine CERCLA evaluation criteria. These criteria are summarized in Section 8 and detailed in Appendix A.

1.3.3 RI/FS Data Generation and Reporting

Major components of the RI/FS process will include identifying data needs, developing work plans and possible related addenda to fill data gaps, and generating and evaluating the resulting data. Currently, it is anticipated that these steps will be repeated four times (including the pre-AOC studies conducted in 2001) before the RI and FS are completed. Additional focused data gathering in support of remedial design and remedial action may occur after the ROD. The RI process is both iterative and sequential. Validated results with corresponding sampling location information from previous rounds of investigation will be documented and provided in accordance with the approved project schedule to EPA for review to guide in scoping subsequent rounds of the investigation. The Round 1 data, collected in 2002 and described in greater detail below, will be evaluated in a Round 1 site characterization summary report and an ecological preliminary risk evaluation report (described below), both of which will be submitted within 120 days after the Round 1 data collection and analysis effort is completed. It is anticipated that several Round 2 FSPs will be developed to address the various investigation tasks defined for Round 2 (Section 7).

Validated analytical data will be provided to EPA within 90 days of each sampling activity (e.g., Round 2 surface sediment sampling, Round 2A sediment coring, Round 2B sediment coring, sediment beach sampling, surface water sampling, groundwater pathways sampling, Round 3 sampling and any other sampling activity). As specified in the AOC, and upon request, analytical data will be made available to EPA within 60 days of each sampling activity. Field sampling reports will be prepared and submitted to EPA within 60 days of completing of each sampling activity. The field sampling reports will summarize field sampling activities, including sampling locations (maps), requested sample analyses, sample collection methods, and any deviations from the FSP. Sample analysis results will be reported in tabular format in site characterization reports within 120 days of completing sampling and analysis for each sampling activity. Data will be provided in electronic format showing location medium and results. Data will be provided in sufficient detail for EPA and its partners to begin preliminary analysis.

Round 2 data evaluation results will be presented in the comprehensive site characterization summary and data gaps analysis report (together with pre-AOC and Round 1 data), which is planned for submittal 120 days after the Round 2 data collection and analysis effort is completed. The ecological and human health baseline risk assessment reports will be submitted concurrently with the RI report, which will be prepared after all sampling and analysis rounds for the project are completed.

The EPA (2000a) DQO process was applied to the existing data (see Section 7). Results of this data evaluation process form the basis of the field sampling plans, submitted under separate cover. A similar data evaluation and DQO process will occur following the evaluation of data generated during Rounds 1 and 2. The DQOs will be updated and focused following the various Round 2 investigation efforts to

incorporate new data. Prior to future sampling events, work plan addenda will be prepared, in which the DQO process will be revisited and the new data needs identified. Field sampling plans will be prepared to address the new sampling needs.

Round 1 sampling was conducted in the summer and fall of 2002, prior to the approval of the Work Plan. Sampling in 2002 was conducted in accordance with the Round 1A and Round 1 field sampling plans (SEA et al. 2002b,c). Round 1A sampling (described in the Round 1A FSP) included:

1. Collection of fish and shellfish tissue for chemical analysis
2. Evaluation of epibenthic colonization using multiplates
3. Reconnaissance survey of plants and amphibians
4. Reconnaissance survey of adult lamprey
5. Measurement of riverbank erosion and accretion using sediment stakes
6. Multibeam bathymetry – low water.

The subset of Round 1 sample collection tasks (described in the Round 1 FSP) that were approved by EPA in September 2002 included:

1. Beach sediment chemistry
2. Reconnaissance-level benthic infauna community analysis
3. Collocated sediment chemistry at sculpin, crayfish and benthic infauna stations.

In September 2002, the LWG also undertook a reconnaissance survey of juvenile lamprey and benthic infauna for potential tissue analysis. Because these were the only data collection efforts in 2002, the combined efforts are referred to simply as “Round 1” sampling in the remainder of this document.

Results of each of these sampling tasks will be submitted to EPA either as stand-alone data reports or as part of the Round 1 Site Characterization Summary Report. A list of all RI/FS project reports and deliverables provided to EPA through September 2003 is presented in Table 1-1.

Round 2 will focus on determining the distribution of chemicals in sediments in the ISA. Also, water quality data will be collected to evaluate potential effects of sources on the river system and to support the risk assessments. These data will be used, along with Round 1 and historic Category 1 results, to identify areas with elevated concentrations of chemicals in the sediments and the water column, and tissue residue levels, so that risk estimates can be made to identify the receptors and pathways that appear to be driving risks at the Site. The derivation of the Round 2 sampling

program, and the associated data uses, are described in detail in Section 7 of this Work Plan.

Round 3 work will be conducted to refine sediment management areas (including principal threats areas, if necessary), gather data for the evaluation of FS alternatives, and fill in risk assessment or RI data gaps, as necessary.

1.4 CULTURAL RESOURCES

The LWG has initiated planning activities for an evaluation of cultural resources and cultural uses using a typical approach provided for under Section 106 of the National Historic Preservation Act (16 USC Section 470). The LWG will coordinate cultural resource work with appropriate tribes to ensure a full and comprehensive cultural resource analysis is done when characterizing Site use. The cultural resource analysis will be initiated in 2004 following receipt of a memorandum from EPA that defines the scope of work and will be considered in future work.

1.5 COMMUNITY RELATIONS

As described in the SOW (Section 5, Task 3), the development and implementation of the plan are the responsibility of EPA.

1.6 WORK PLAN ORGANIZATION

This Work Plan, consisting of 11 sections and seven associated appendices, contains information for the overall implementation of the RI/FS. As approved by EPA in a letter dated April 10, 2002, background information on the Site is provided within the Work Plan and associated appendices instead of in a separate historical data compilation report. Consequently, the body of the Work Plan contains considerable detail on Site background information. Several appendices are also significant documents that include additional data summary information, as well as the ecological risk assessment (ERA) approach, the human health risk assessment (HHRA) approach, and the FS approach. A preliminary CSM is presented in Section 5. Revisions to the CSM will be submitted prior to the development of the Round 2B sediment coring FSP. The Round 1 QAPP (SEA 2002e) for the Site has already been submitted to, and approved by, EPA. A Round 2 QAPP will be prepared, and approved by EPA, before Round 2 sampling activities are conducted. The Health and Safety Plan (SEA 2002d) has also been provided to EPA. Field sampling plans will contain the rationale for sampling, as well as the sampling station locations, numbers of samples, and analytes. They will also contain sampling and analysis methods. The remaining sections of this Work Plan include the following information:

Section 2: Physical Setting. This section discusses the physical attributes of the study area, including hydrogeology, hydrology, bathymetry, and physical characteristics of sediments, sediment transport, and dredging.

Section 3: Chemical Sources. This section describes different types of chemical sources that may affect the ISA, and chemical transport.

Section 4: Summary of Previous Investigations. This section contains an overview of previous sediment, water quality, ecological, and cultural and human use studies. The data quality review process that was applied to the existing chemical and biological data is also discussed in this section. Additional information on ecological receptors is provided in Appendix B (Ecological Risk Assessment Approach).

Section 5: Preliminary Conceptual Site Model. This section presents the physical, ecological, and human health conceptual site models.

Section 6: Overview of Portland Harbor Site RI/FS Process. This section contains the road map for the project, including sections on remedial action objectives, sampling rounds, ecological and human health risk assessment, reporting, feasibility study, and the Record of Decision.

Section 7: Site Characterization Approach. This section contains the DQOs developed for each significant work element, a description of the data needed for those work elements, a description of the RI and risk assessment task work elements, and information on how those data will be used in the RI/FS.

Section 8: Feasibility Study Approach. This section contains the DQOs developed for each significant FS work element, a description of the data needed for those work elements, a description of the FS task work elements, and information on how those data will be used in the FS.

Section 9: Project Management Plan. This section reviews information on how the project will be managed, including roles and responsibilities, contact information, communications, schedules, and cost control.

Section 10: References. This section contains references for the documents cited in the Work Plan.

Section 11: Glossary of Terms. This section contains definitions of terms used in the Work Plan.

As noted above, the following appendices to this Work Plan are, in themselves, significant documents:

Appendix A: Feasibility Study Work Plan. This appendix contains the approach for conducting the FS, as well as the four FS-related technical memoranda required by the AOC. This approach is summarized in Section 8 of this Work Plan.

Appendix B: Ecological Risk Assessment Approach. The ecological risk assessment approach is discussed in detail in Appendix B. A brief overview of the ERA approach is provided in Section 7.3 of this Work Plan.

Appendix C: Human Health Risk Assessment Approach. Similar to Appendix B, Appendix C contains the detailed human health risk assessment approach. A brief overview of the approach is also provided in Section 7.4.

Appendix D: Changes in Sediment Volume. Appendix D contains a series of graphs, organized by river mile, that show net change in sediment volume in Portland Harbor since 1990. These graphs were developed by comparing sequential bathymetric surveys performed in the federal navigation channel by the U.S. Army Corps of Engineers (Corps), Portland District. A description of the process used to generate the graphs is included.

Appendix E: Chemical Sources and Spill Records. This appendix contains information on chemical sources and Oregon Department of Environmental Quality (DEQ) spill records.

Appendix F: Data Sources and QA/QC Reviews. The sources of information compiled to develop the Work Plan are provided in Appendix F. For ease of use, Appendix F is organized by subject. Assessments of data quality assurance/quality control (QA/QC) are also provided for sediment chemistry, water chemistry, tissue chemistry, bioassays, and benthic infauna surveys.

Appendix G: Data Management Plan. This final appendix contains the project Data Management Plan.

2.0 PHYSICAL SETTING

This section describes the physical setting of the Portland Harbor Site, including an understanding of the hydrogeology in the vicinity of the ISA, as well as river hydrology, bathymetry, physical sediment characteristics, fate and transport processes, and dredging history. Each of these factors must be considered in the development of the conceptual site model, future sampling events, and the design of remedial alternatives. This discussion focuses primarily on the physical setting in the ISA and immediately adjacent areas of the Portland Harbor. However, LWR and Willamette basin physical features are also described generally as warranted based on their potential influence on the Site. A corresponding presentation of the ecological setting of the ISA is provided as part of Appendix B (Ecological Risk Assessment Approach).

The Willamette River drains the Willamette basin from the Cascade Range to the Coast Range. The river basin has a drainage area of 11,500 square miles and is bordered by foothills and mountains of the Cascade and Coast ranges up to 10,000 feet high to the south, east, and west (Trimble 1963). The main channel of the Willamette forms in the southern portion of the valley near Eugene, at the convergence of the Middle and Coast forks. It flows through the broad and fertile Willamette Valley region and at Oregon City flows over the Willamette Falls and passes through Portland before joining the Columbia River.

The Willamette flows predominantly from the south to the north and has a total channel length of about 309 miles. It is the 10th largest river in the contiguous United States in terms of volume and the 13th largest in terms of discharge. The portion of the river from the Willamette Falls to the Columbia is considered the lower Willamette River (Map 1-1).

Water velocity in the Willamette is variable, but is generally higher in the upstream reaches of the river. Major tributaries draining the Coast Range and flowing east into the main channel of the Willamette include the Mary's, Luckiamute, Yamhill, and Tualatin rivers. The McKenzie, Calapooia, Santiam, Mollala, and Clackamas rivers flow westward from the Cascades into the Willamette. The Pudding River flows south to north and intersects the Mollala before flowing into the Willamette south of Portland.

The upstream reaches of the Willamette constitute a meandering and, in some cases, braided river channel. Upstream flooding is largely controlled by 13 major tributary reservoirs (Uhrich and Wentz 1999). In the LWR, especially near and around Portland, the channel banks have been stabilized, and the channel itself has been deepened to an authorized depth of -40 feet. These measures have created a stable channel in the LWR. The federally maintained navigation channel defines Portland Harbor and extends upstream from the Columbia River to RM 11.6 (Broadway Bridge) (Map 1-1). From 1973 through 2000, annual mean flow in the Willamette

River flow averaged approximately 33,800 cubic feet per second (cfs) at the Morrison Bridge in Portland.²

2.1 HYDROGEOLOGY

The generalized hydrogeology of the ISA is presented in this section. This information represents the current understanding of the general hydrogeologic setting of the ISA. Additional information will be developed during the RI/FS to further the understanding of the hydrogeology of the ISA. The detailed hydrogeology of the upland areas on both sides of the river varies by location. This generalized discussion is intended to describe the important basic hydrogeologic units and their properties and groundwater flow within the ISA and does not completely represent any one particular location. An upland groundwater data review that summarizes information from a review of hydrogeologic and groundwater quality data from upland sites in the vicinity of the ISA has been completed by the LWG. Results of groundwater reviews will be provided in Conceptual Site Model updates.

2.1.1 Geologic Setting

The ISA is located along the southwestern edge of a large geologic structure known as the Portland Basin. The Portland Basin is a bowl-like structure bounded by folded and faulted uplands. These northwest-trending structural zones are interpreted as dextral wrench faults that delineate the Portland, pull-apart basin (Beeson et al. 1985; Yelen and Patton 1991).

The basin has been filled with up to 1,400 feet of alluvial and glacio-fluvial flood deposits between the middle Miocene [approximately 12 million years ago (mya)] and the present. These sediments overlie older (Eocene and Miocene) rocks including the Columbia River Basalt Group (CRBG), Waverly Heights basalt, and older marine sediments. The older rocks are exposed where uplifting has occurred on the margins of the basin, including adjacent to the ISA.

Because the ISA is located at the edge of the basin, both the older rocks and overlying sediments are present near the surface and play a significant role in defining interactions between groundwater and the river. The geologic units found in the area of the ISA are illustrated in Figure 2-1 and briefly described below from youngest to oldest (Beeson et al. 1991; Swanson et al. 1993):

- **Recent Fill.** Fill blankets much of the lowland area next to the river and is predominantly dredged river sediment, including fine sand and silty sand. Hydraulic dredge fill was used to fill portions of the flood plain, such as Doane Lake, Guilds Lake, Kittridge Lake and Mocks Bottom, and a number of sloughs and low-lying

² Data obtained from the U.S. Geological Survey Water Resources web site (<http://waterdata.usgs.gov/or/nwis/sw>).

areas. The fill also was used to connect Swan Island to the east shore of the Willamette River and to elevate or extend the bank along significant lengths of both sides of the riverfront by filling behind silt and clay artificial and natural flood levee dike structures. Rocks, gravel, sand, and silt also were used to fill low-lying upland and bank areas. The thickness of this unit ranges from 0 to 20 or more feet. The permeability of this unit, where composed of clean dredge fill sand, is higher than the natural fine-grained alluvium. The presence of silt fill or a silty matrix in the sand fill generally reduces the permeability of the unit significantly.

- **Fine-grained Pleistocene Flood Deposits and Recent Alluvium (Undifferentiated).** This unit includes fine-grained facies of the Pleistocene Flood Deposits, as well as recent alluvium deposited by the present Willamette River. This unit generally consists of silt, clay, silty sand, and fine to medium sand that borders and underlies the present floodplain of the river (Beeson et al. 1991). The lower portions of this unit and where it forms the large bluffs bordering the east side of the river likely consist of the fine-grained facies of the flood deposits; whereas the upper portions near the river are likely more recent alluvium. The upper fine-grained portion of the unit has likely been reworked and deposited by the present Willamette River. The sands of this unit may be indistinguishable from overlying dredge fill in some places (Landau Associates 2002). The thickness of this unit ranges from 20 to over 100 feet. The permeability of the clay, silt, and silty sand of this unit is generally relatively low, whereas the portions of the unit consisting of clean sands may have a relatively higher permeability. This unit forms part of the Unconsolidated Sedimentary Aquifer regional hydrostratigraphic unit proposed by Swanson et al. (1993).
- **Coarse-grained Pleistocene Flood Deposits (Gravels).** This unit includes fluvial deposits from the Pleistocene Missoula floods. The deposits fill deep channels that were incised into the Troutdale Formation and CRBG during the floods. The unit consists of uncemented sand, gravel, and cobbles with boulders in places. This unit is generally between 10 and 200 feet thick in the vicinity of the ISA and underlies fine-grained flood deposits and recent alluvium under much of the ISA. The Willamette River subsequently incised the flood deposits in places. The rise in sea levels from the end of the Pleistocene to the present created aggradational conditions that resulted in the filling of the incised channel by finer-grained flood and recent alluvial facies to form the current floodplain channel of the river. .

- **Upper Troutdale Formation.** The upper Troutdale Formation in the vicinity of the LWR includes cemented and uncemented alluvial sand, gravel, and cobbles deposited by the ancestral Willamette and Columbia rivers. The Troutdale Formation comprises the Troutdale Gravel Aquifer hydrostratigraphic unit. This unit is present in some places on the west side of the ISA to thicknesses of 100 feet, and is present along the entire length of the east side of the ISA at thicknesses of up to 200 feet (Swanson et al. 1993).
- **Lower Troutdale Formation/Sandy River Mudstone.** The Sandy River Mudstone (SRM) is a fine-grained equivalent (over-bank facies) of the lower Troutdale Formation (channel facies) that overlies the CRBG in the center of the basin and at the margins of the basin away from the axis of the Columbia River. The SRM is present in places under the LWR (Swanson et al. 1993) and borders the Portland Hills, but is not considered a significant hydrogeologic unit within the ISA. The SRM consists mostly of silt and clay with lenses of sand and gravel. The SRM tends toward fine-grained (low permeability) textures at the basin margins (Swanson et al. 1993).
- **Columbia River Basalt Group.** The CRBG consists of a thick sequence of Miocene basalt flows dating from between 17 mya and 6 mya, but the CRBG flows that underlie much of the Portland Basin entered the area between 16.5 mya and 12 mya. Basalt flows of the CRBG were folded and faulted during the uplift of the Tualatin Mountains, concurrent with eruption and emplacement of younger flows present in the Portland Basin (Beeson et al. 1991). The CRBG is present at the surface or at relatively shallow depths along the west side of the ISA and may be in direct contact with the river in places. The top of the unit drops off below ground surface (bgs) over a relatively short distance and is 400 or more feet bgs on the east side of the ISA. The thickness of the CRBG in the vicinity of the ISA is estimated to be approximately 600 feet (Beeson et al. 1991).

2.1.2 Hydrogeologic Units

The geologic units described above can be grouped into ISA-wide hydrogeologic units on the basis of having generally similar hydrogeologic characteristics. Important hydrogeologic characteristics include the position of the groundwater surface relative to each hydrogeologic unit, the physical relationship between each hydrogeologic unit and the river, and physical characteristics of each hydrogeologic unit, such as permeability, heterogeneity, and anisotropy.

These hydrogeological units are described from uppermost to lowermost in the following sections:

Fill, Fine-grained Facies of Flood Deposits, and Recent Alluvium (FFA). The FFA unit is composed of the fill, and the combined fine-grained facies of the Pleistocene flood deposits and Recent alluvium geologic units described by Beeson et al. (1991), and in Section 2.1.1. This unit encompasses a broad range of soil textures and hydraulic characteristics that blankets much of the lowland area next to the river and comprises much of the material abutting the river. The unit consists of the fine sand and silty sand dredge fill overlying recent and Pleistocene silt and clay overbank sediments, which are interbedded with lenses and layers of fine to coarse sand. As discussed in Section 2.1.1, the dredge fill was placed behind low-permeability, artificial and natural flood levee dike structures in some locations. The overall thickness of this unit ranges up to 150 feet; the thickness of the unit more typically ranges between 30 and 100 feet.

The FFA hydrogeologic unit is the primary unit of importance in defining the interactions between upland groundwater and the river because of the following characteristics of the unit:

- The unit forms most of the river channel within the ISA as well as the surrounding upland areas, and therefore controls groundwater interactions with the river.
- Most groundwater chemical plumes present in the upland areas occur within strata of this unit.

The distribution of textures and thus groundwater flow properties of the unit vary both vertically and horizontally by location along the ISA. Silt, clay and silty sand are present adjacent to the river at a majority of locations where the unit is observed near low river stage levels. Boring logs at sites north of RM 4 on the east side of the river indicate that a greater portion of the unit north of RM 4 and at depths below low river stage levels consists of sand layers. Comparison of hydraulic conductivity values for different textures within the FFA unit listed below illustrates the importance of the channel sand lenses and layers in focusing groundwater fluxes to the river at any particular location where present within this unit:

- Silt/clay: 0.005 to 2 feet per day
- Silty Sand: 0.1 to 2 feet per day
- Sand: 0.5 to 30 feet per day.

Typical measured hydraulic conductivities in the silt/clay facies of the FFA indicate that groundwater fluxes from these sediments within the ISA are generally low. Observations of seeps present in silt/clay during the seep reconnaissance survey (GSI 2003b) are consistent with this conclusion. Conversely, groundwater fluxes from the

uplands to the river within the FFA are expected to be greater in those areas where more permeable sand zones are present.

Coarse-grained Flood Deposits and Upper Troutdale Formation (CGF). The CGF unit combines the unconsolidated coarse-facies flood deposits, including sands, gravels and cobbles, with the underlying uncemented and cemented gravels and cobbles of the upper Troutdale Formation. The flood gravels comprising the upper portion of this unit typically occupy scour channel surfaces on older units (e.g., the CRBG). Fill, silt, clay, and sand of the flood deposits and alluvium mostly blanket the CGF, except in places on the highland bluffs on the east side of the river where the unit may be exposed.

The CGF unit is adjacent to and underlies much of the ISA to thicknesses exceeding 200 feet. The overall thickness of the unit is more typically in the range of 100 feet. However, the unit is missing in places, including on the west side of the river towards the south end of the ISA and directly under the river at RM 7. The top of the CGF unit is present at elevations of 0 feet to over -100 feet mean sea level (MSL). The unit is present at relatively shallow depths adjacent to the west side of the river in the vicinity of the Doane Lake area, and may be in contact with river sediments (Figure 2-1). The hydraulic conductivity of this unit measured in the vicinity of the Doane Lake area ranges from 3 feet per day to greater than 40 feet per day (AMEC 2001).

This unit may act as a preferential groundwater flow pathway for groundwater flow to deeper units and for deeper groundwater flow to the river where the unit is present adjacent to the river. Higher fluxes to the river within the CGF unit may increase downward gradients and thus groundwater and contaminant plume movement in the FFA unit. The effect of the CGF unit on groundwater flow in the FFA is a factor in the selection of characterization methods. Locations where the CGF unit may exert a stronger influence on deeper groundwater flow to the river and thus vertical gradients in the FFA include the Doane Lake area, the southern edge of the ISA, and on the east side of the river in the vicinity of the International Terminal.

Lower Troutdale Formation/Sandy River Mudstone. This hydrogeologic unit is present in some places under the west side of the ISA and is present under the entire length of the east side of the ISA. The unit is predominantly silt and clay where explored in the vicinity of the ISA, and thus the permeability of the unit is low. Where present, the unit overlies the CRBG below depths of -100 to -150 feet MSL, and tends to pinch out on the west side and towards the southern end of the ISA where the CRBG is present at shallower depths. The unit typically is separated from the river by at least 100 to 200 feet of alluvium and the upper Troutdale Formation. Based on the hydrogeologic characteristics of this unit and the depth relative to the river, it is not considered to contribute significantly to surface water/groundwater interactions within the ISA.

Columbia River Basalt Group. The CRBG consists of a concordant sequence of basalt lava flows. Groundwater flow in the CRBG is focused along the higher

permeability interflow zones and in some areas of fracture-enhanced permeability (e.g., faults). Hydraulic conductivities measured in individual basalt interflow zones in the vicinity of the ISA range from 1.5 to 10.9 feet per day (AMEC 2001). Hydraulic conductivities measured in CRBG basalt flow interiors at Hanford, Washington, range from 1×10^{-4} to 1×10^{-7} feet per day (Strait and Mercer 1986), illustrating that the basalt interflow zones (flow top and bottom collectively) are the primary groundwater flow pathways in the CRBG.

The CRBG is present at relatively shallow depths along portions of the west side of the ISA and may be in direct contact with the river in places. The top of the unit is irregular on the west side of the ISA with channels from scouring by flood events and the ancestral Willamette River. The top of the unit on the west side of the ISA is between elevation 0 MSL and – 50 feet MSL north of RM 9, except for an ancestral channel in the vicinity of Doane Lake. The top of the CRBG slopes down to an elevation of –250 feet MSL or more across the river on the east side of the ISA (Figure 2-1). The relief of the unit across the ISA appears to be due to structural downwarping towards the center of the basin, and may be accentuated by normal faulting postulated along both sides of the ISA (Beeson et al. 1991; Beeson 2003). The overall significance of the CRBG with regard to groundwater/surface water interactions within the ISA is not known; however, the CRBG is considered for to be most relevant to groundwater interactions with the river on the west side of the river downstream of about RM 9 because of its proximity to the river.

2.1.3 Groundwater Flow

Up to three general groundwater flow systems of interest are recognized along the ISA: a shallow (shallow FFA), an intermediate (deep FFA), and a deep (CGF and CRBG) system. A deeper, regional flow system also is present, which includes the CRBG where it is deep below the river (on the east side of the river) and lower Troutdale Formation/SRM. This deeper, regional flow system is not considered to be important in understanding the critical interactions directly between upland groundwater and the river that are relevant to this RI/FS.

At a local level, these divisions between flow systems are likely indistinct in places along the ISA. Many investigations have focused on the FFA and, in places, the CRBG, and have identified further flow system refinements or divisions based on the local hydrogeology. However, the general flow systems described above appear to apply for the majority of the ISA and provide a basis for evaluating variations from the general model.

The Willamette River is the focus of discharge for the three flow systems of interest to the RI/FS, including where the CRBG is present near the surface on the west side of the river. The shallow flow system is the primary focus of most upland groundwater investigations, and will be the focus of this RI/FS because most of the upland groundwater affected by contaminants of interest is present within this system,

and this system discharges to the shallow and nearshore areas where exposure to human and ecological receptors is most likely. The potential for impact to the deeper system is relatively low, except where there may be a large source of dense non-aqueous phase liquid (DNAPL) that has the potential to migrate to the FFA and/or upper portion of the basalt. Impact to sediments from the shallow and intermediate flow systems will be the focus of the Work Plan effort (described in Section 7), except at locations where the CGF and CRBG appear to be impacted by chemical constituents and are connected to the river.

Shallow Flow System

A shallow, unconfined, groundwater flow system along the margins of the ISA consists mostly of fill and alluvial silt and clay deposits and some medium to coarse-grained channel sand of the shallow FFA that blankets the lowlands next to the river (Figure 2-1). At many locations, the shallow flow system is hosted within the lower portion of fine dredge fill sand and underlying silty sand and silt. The shallow system is recharged by direct precipitation and infiltration, infiltration from the hills on the west side of the ISA, and exchange with several surface water bodies along the ISA (e.g., Doane Lake). Groundwater in this system is unconfined. Groundwater level data in the upland areas indicate that there is a downward gradient toward deeper units from the shallow system. Groundwater levels and fluxes in the shallow system are affected by seasonal river stage changes, as well as by diurnal tidal influences, with decreasing degree of influence with increasing distance from the river and shallower groundwater depths. Groundwater gradients within the shallow system are generally steep immediately adjacent to the river and flatten out away from the riverbank. The shallow flow system discharges to the river as surface seeps and subsurface discharge in near-shore areas.

The permeability of the FFA materials is variable within the shallow flow system, but generally is relatively low. Thus, fluxes to the river from shallow flow system are low. The presence of low-permeability features, such as silt and clay dikes constructed to retain hydraulically emplaced dredge fill, cutoff walls and retaining walls, may act to impede groundwater flow in the shallow system, resulting in higher groundwater levels and steep shallow groundwater gradients near the shore. Because of the generally low permeability of the shallow FFA sediments and the presence of these low-permeability features, preferential pathways (human-made and natural) influence the discharge of groundwater to the river.

Light non-aqueous phase liquid (LNAPL) spills are present only within the shallow flow system. Dissolved chemicals associated with upland releases are present in the shallow flow system. Dissolved plumes may be affected by vertical hydraulic gradients, which may cause vertical migration of the dissolved constituents. The shallow system also appears to influence the effect of DNAPL releases by retaining a portion of the released volume through spreading and retention in or along less permeable sediments. These stratigraphic controls can limit the depth of downward migration of DNAPL.

Intermediate Flow System

The intermediate flow system occurs within thicker sequences of the fine-grained alluvial sediments of the FFA. Groundwater in the intermediate system discharges to the Willamette River below the river surface to deeper portions of the river, with discharge focused at the locations where more permeable strata (typically sand) may intersect the river. Horizontal hydraulic gradients within the intermediate flow system tend to be flatter near the river than the shallow system, and thus high river stages and tidal changes may exert a greater influence on fluxes from the intermediate system to the river by further flattening or perhaps reversing the gradient locally.

The intermediate flow system is particularly relevant for groundwater transport of chemicals to the river where DNAPL is present or where chemical densities, preferential pathways, or downward gradients could potentially allow dissolved chemical constituents to penetrate into the deeper units. The intermediate flow system is the most likely mechanism that would allow for groundwater discharge into the sediments present in the deeper portions of the Willamette River. However, most groundwater chemical plumes identified in the upland areas of the ISA do not occur within the intermediate flow system.

Deep Flow System

The deep flow system occurs within the CGF and basalt interflow zones of the CRBG where the CRBG is present near the surface on the west side of the river. Groundwater in the deep system discharges to the Willamette River only in deeper portions of the river, with discharges focused at the locations where the gravels and/or basalt interflow zones are near or intersect the river sediments (Figure 2-1).

The CRBG ceases to play a role in this flow system on the east side of the river. The flow system becomes strongly affected by the Columbia River on the east side of the ISA with increasing distance from the Willamette River. The CGF is generally highly transmissive; however, gradients may be relatively low. Seasonal gradient reversals are known to occur during periods of high river stages. Where near the river, the connection and thus response to river stage changes is expected to be great.

The deep flow system is not anticipated to play a significant role in groundwater contaminant transport from the upland areas to the river within the ISA because the majority of contaminants in groundwater are not present within this system.

2.1.4 Processes Governing Discharge of Groundwater to the ISA

Generally, groundwater flow adjacent to the ISA is toward the river. In the absence of preferential pathways, groundwater flow to the sediments and river will be diffuse along the length of the interface of each flow system with the river. However, permeability contrasts of several orders of magnitude can be expected in the FFA where alluvial processes create lenses and channels of sand within or surrounding finer-grained materials. The result of these permeability contrasts is that groundwater

discharge will tend to be heavily influenced by the location and geometry of higher permeability layers (e.g., sands) in relation to the river.

Discharge from the shallow water-table groundwater system will tend to be focused at or below the river/shore interface. Low river stages expose zones of focused discharge as seeps along the bank where the shallow groundwater surface intersects the ground surface. Preferential pathways, including coarse backfill (e.g., around utilities), historic stream channels, or sand/gravel layers focus groundwater flow, particularly where they occur in predominantly fine-grained sediment sequences in the shallow groundwater system. The majority of discharge to the river generally occurs where these preferential pathways intersect the riverbank. Full gradient reversals between the river and the shallow groundwater system are rare and likely localized near the bank because of the relatively high groundwater levels within the shallow groundwater system in the upland areas and resultant steep hydraulic gradients along the riverbank. However, very high river stages tend to reduce and may, in some areas, even temporarily reverse the shallow groundwater gradient locally. The groundwater flow regimes of all of the flow systems show seasonal patterns related to seasonal river stage and precipitation variations.

The gradient and resultant flux from these systems fluctuate with seasonal river stage changes, with temporary flow reversals occurring during seasonal high river stage events. Diurnal stage changes also result in temporary gradient and thus flow changes, particularly where the degree of connection between the river and adjacent aquifer is greater. Discharge of these deeper groundwater flow systems through the river sediments to surface water is controlled by (1) the permeability contrast between the sediments and underlying aquifer, and (2) the difference between the hydraulic head in groundwater at the aquifer/sediment interface and the river stage, which determines hydraulic gradient.

2.1.5 Groundwater/Surface Water Transition Zone

The groundwater/surface water transition zone (Transition Zone) is the interval where both groundwater and surface water comprise some percentage of the water occupying pore space in the sediments. The physical and biochemical properties of water within the Transition Zone reflect the effects of mixing between groundwater and surface water that occurs within the sediments. The Transition Zone is significant to the RI/FS because it is the location where important chemical and biological transformation processes occur that affect the properties of chemicals that may be present in groundwater, and it encompasses the sediment bioactive zone where benthic infaunal ecological receptors reside.

The zone of mixing between groundwater and surface water that defines the size of the Transition Zone exhibits temporal and spatial variability due to changes in gradients between the surface water and groundwater. The depth and degree of mixing is anticipated to be relatively small in shallow river sediments that are in

contact with the shallow groundwater flow system. In these areas, relatively high groundwater hydraulic heads within the shallow groundwater flow system adjacent to the river dominate the river stage fluctuations. High river stages will change the relative hydraulic gradient and thus reduce the discharge rate from the shallow groundwater flow system through the sediments, but will not likely result in a significant overall increase in the depth of mixing of surface water with groundwater. Groundwater is expected to comprise a greater percentage of the water in the shallower water bioactive zone than deeper water locations where the deeper flow systems discharge to the river.

2.2 HYDROLOGY

River stage and currents in the LWR and Portland Harbor are influenced by hydrologic conditions in both the Willamette and Columbia rivers, and are further affected by the operations of federal and non-federal dams along these two rivers. River stage refers to the height of the river measured relative to a specific elevation or “datum.” A variety of vertical datums are used in the Portland Harbor region, and these are discussed below. Definitions of regional datums and other hydrologic terms are also included in the Glossary of Terms (Section 11).

2.2.1 Regional Datums

Current or historical bathymetric and topographic data may be referenced to a variety of vertical datums in Portland Harbor. The bathymetric data collected as a part of this RI/FS are presented relative to the **North American Vertical Datum of 1988 (NAVD88)**. This vertical datum is the national standard geodetic reference for heights and was selected for this project because it is a level datum and is easy to use with global positioning systems (GPS). NAVD88 is a fixed datum derived from local mean sea level observations at Father Point/Rimouski, Quebec, Canada. NAVD88 replaced NGVD29/47 as the national standard geodetic reference for heights.

The **National Geodetic Vertical Datum of 1929 through the Pacific Northwest Supplemental Adjustment of 1947 (NGVD29/47)** is a fixed datum adopted and adjusted in 1947 as a national standard geodetic reference for heights prior to June 24, 1993 and is now considered superseded by NAVD88. NGVD29 is sometimes referred to as Sea Level Datum of 1929 or as MSL on some early issues of U.S. Geological Survey topographic quads. NGVD 29 was originally derived from observations at 26 long-term tide stations in the U.S. and Canada. Data referencing MSL as the vertical datum in the Portland Harbor is technically on NGVD29/47.

The **Columbia River Datum (CRD)** is used as the chart datum for the lower Willamette River. CRD is a reference plane established by the Corps in 1912 by observing low water elevations at various points along the Columbia and Willamette

ivers (USACE 1966). Consequently, the CRD is not a fixed/level datum but slopes upward as one moves upstream. The CRD is used upstream of RM 24 on the Columbia to the Bonneville Dam and on the Willamette River to Willamette Falls. Mariners can obtain the depth on a chart and apply tide or river-level gauge readings, relative to CRD to compute actual water depth at the time of sailing. Low water values are used for navigation charting to provide conservative depth values in the event accurate tide data are not available to the mariner.

These three datums, NAVD88, NGVD29/47, and CRD, are the major ones used on maps and charts of Portland Harbor. The relationships or conversion factors between them are shown in Table 2-1 for the LWR to about RM 16 (Ross Island). This conversion table is also included on all LWG project bathymetry maps. In the lower Willamette, elevations reported relative to the CRD are approximately 5 feet less than NAVD88 elevations (e.g., the -15 foot NAVD88 contour on LWG bathymetry maps equates to a -20 foot CRD elevation).

Water level (river stage) data measured by the Morrison Bridge gauge (RM 12.8) are recorded as the **Portland River Datum (PRD)** and are 1.55 feet above NGVD29/47 (USACE 1991). The CRD is 1.85 feet above NGVD29/47 at the Morrison Bridge. On December 27, 2001, David Evans and Associates, Inc. (DEA) confirmed the relationship between this gauge and the CRD by running a differential leveling circuit from a nearby control monument used in the control network for the Willamette multibeam surveys. This survey confirmed that the Morrison Street staff gauge reports water levels 0.30 foot above CRD, as defined by the Corps (1991).

The river stages discussed below in Section 2.2.2 are the directly measured Morrison Bridge gauge levels and are therefore reported as PRD elevations in feet. To convert from PRD to CRD, subtract 0.3 foot from the reported river level.

2.2.2 Willamette River Stages

The Columbia River drains a large segment of the northwestern United States and parts of western Canada. The basin is so large that isolated events such as rainstorms may have little or no effect on river flow. In its natural state, high flows on the Columbia River are most influenced by snow melt, which takes place in the basin during the spring months. This results in high water typically occurring in late May or early June followed by receding water levels until the rains begin in late fall.

Lowest water on the Columbia River typically occurs in the months of October or early November, reflecting a lack of precipitation and snowmelt in the basin during the summer months. With the onset of winter rains and snow, runoff will vary during the winter months until the snowmelt takes place in the spring leading to the high water period described above.

The Willamette River is a major tributary of the Columbia River and flows into the river at Columbia River mile 103. Lowest water in the Willamette, as in the Columbia, typically occurs between September and early November prior to the initiation of the winter rains. With the onset of the rains, flows in the Willamette will generally increase, sometimes in rapid (several days) response to regional storms. The record winter floods (e.g., 1964 and 1996) occurred when a period of heavy snowfall at lower elevations was followed by a period of warming and heavy rains. The combination of the snowmelt and rain leads to exceptionally high runoff that occurs rapidly due to the small size of the basin as compared, for example, with the Columbia River basin.

Figure 2-2 shows plots of the mean daily river stage data (reported in feet, PRD) measured by the U.S. Geological Survey (USGS) gauge (#14211720) on the Morrison Bridge in Portland near RM 12.8, from 1973 through mid-August 2003³. The seasonal water level trends described above are evident in these plots. Low water typically occurs during the regional dry season from August to November. Winter (November to March) river stage is relatively high but variable due to short-term changes in precipitation levels in the Willamette basin. Finally, a distinct and persistent period of relative high water occurs from late May through June when Willamette River flow into the Columbia is slowed during the spring freshet by high-water stage in the Columbia River.

The effect of the multipurpose dams on the Columbia River and its tributaries has been to generally reduce the spring high water flows through ponding of the excess water to the extent permitted by the capacity of the reservoirs at each of the dams. Starting in late summer, this stored water is released, which increases flows above the low flows that would otherwise occur. By winter, these reservoirs have been drawn down and the reservoir capacity is used to take the peak off of winter flows and to optimize the generation of electricity.

There are 13 federal reservoirs on the Willamette River and its tributaries, having a combined storage capacity of over 1.6 million acre-feet. These reservoirs reduce the river flow during the winter snow and rain events by storing water (Table 2-2). With each major storm, water is stored and then released at the end of the storm to smooth out the flow of the river. During persistent rainy periods and/or during exceptionally large precipitation events, the storage capacity may be exceeded, and additional flow entering the system leads to flooding as occurred in 1964 and 1996. During these flood events, water flow in the river can be up to 50 times greater than the flow during low-water periods. Late in the winter, after the probability of a major flooding event has passed, the reservoirs are filled to capacity. These reservoirs are used for

³ Data obtained from the U.S. Army Corps of Engineers (Portland District) Reservoir Regulation and Water Quality Section web site (<http://www.nwd-wc.usace.army.mil/cgi-bin/DataQuery>). This site notes that these “data have not been verified and may contain bad and/or missing data and are only provisional and subject to revision and significant change.” The data are used here only to illustrate long-term relative trends in the Willamette River stage at Portland. No data were available for 1991 and 1992.

recreation during the summer and are drawn down in the fall to supplement natural low flows and to provide storage capacity in preparation for the flood season.

Water levels and currents in the LWR can be influenced by the Columbia River in several ways. The most apparent influence occurs during spring when high flows from the Columbia River increase the hydraulic head at the confluence of the two rivers and causes the Willamette River flow to be detained (Figure 2-2). When this occurs, currents in the Willamette are much reduced due to the elevated river stage in the Columbia River. As the Columbia River drops, the Willamette water level will also drop and flows will increase to more typical conditions.

A less obvious influence can occur in the winter when the Willamette River is in flood. The flows on the Columbia River can be held back by its dam system, which has the effect of lowering the backwater effect of the Columbia and thus dropping the levels in Portland Harbor below their typical condition. This mechanism was used in the 1996 flood to reduce the flood levels of the Willamette in Portland Harbor.

Compounding the complexity of the influence of two separate river systems and drainage basins, the Portland Harbor reach is also affected by tidal action. The tidal range at the Pacific Ocean is approximately 8 feet and there are two high tides and two low tides daily. The tidal “wave” comes up the river and when the Willamette River is at a low stage, the tidal action can influence river levels by up to 3 feet in Portland Harbor. These tidal fluctuations can result in upstream flows in the Portland Harbor during times of extreme low discharge combined with a large variation in tide levels, which can occur in late summer to early fall. As river stage rises, the tidal effect is gradually dampened and disappears at river levels around 10 feet CRD.

2.2.3 Willamette River Flows

Velocity data for the LWR consist mainly of data collected over the years by the USGS. The USGS report, *Water Discharge Determinations for the Tidal Reach of the Willamette River from Ross Island Bridge to Mile 10.3, Portland, Oregon*, (Dempster and Lutz 1968), mentions a total of 127 discharge measurements that were conducted during the period from July 1962 to January 1965. The USGS measured velocities using a Price current meter suspended from the Broadway Bridge near RM 11.7 and the Ross Island Bridge near RM 14 (see Map 1-1). Stream flow conditions varied from low tidal-affected flows to the near maximum flood of record during December 1964. Measured cross-sectional mean velocities ranged from a maximum of 8 feet/second downstream during the December 1964 flood to a low upstream velocity of nearly 1 foot/second during a tidal cycle on October 15-16, 1963 (Demptser and Lutz 1968).

From October 1972 to September 1994, the USGS maintained an acoustic velocity meter with water stage and velocity index recorder at the Morrison Bridge gauge near RM 12.8. During that time period, rating curves were periodically updated with

velocity measurements at the gauge location over a range of flow conditions. Since October 1994, the gauge has been jointly operated with the Corps and measures unverified stage only (Lee 2002).

On January 14, 2000, the USGS collected isolated transects of velocity data using a vessel-mounted Acoustic Doppler Current Profiler (ADCP). Transects were collected upstream of the ISA in a relatively narrow stretch of the river at RM 12.8 (just downstream of the Morrison Bridge; see Map 1-1), and in a broader stretch of the river in the ISA near RM 4.1 (Barrett 2002; Wood 2002). According to the upstream Morrison Bridge gauge, the estimated discharge for January 14, 2000 was 99,000 cfs.

Additional ADCP data were collected by DEA for the LWG during a high water event on April 19, 2002 (DEA 2002b). The ADCP was mounted on a 30-foot survey vessel, and transects were taken at RMs 1, 2, 2.5, 3.1 (Multnomah Channel), 4, 4.6 (into T-4 Slip 3), 5.8 (St. John's Bridge), 6.3 (off Gasco), 6.8 (into Willamette Cove), 7.8 (off Willbridge Terminal), 8 (from Coast Guard Station, across shipyard to west bank), Swan Island Lagoon (2 short transects - one across mouth, one at upper end), 9.6, 10, and 11 (see Map 1-1). The river stage at the time of the data collection was approximately 11.6 feet CRD at the Morrison Street Bridge (DEA 2002b).

Water velocities obtained from the ADCP survey ranged from an upstream velocity of nearly 1 feet/second (upstream flow in back eddy) to a downstream velocity of 2 feet/second. Flows across the transects were computed at approximately 70,000 cfs above Multnomah Channel and approximately 35,000 cfs below Multnomah Channel. The Willamette flow on April 19, 2002 was roughly double the average Willamette discharge rate of about 32,000 cfs. Table 2-3 summarizes ADCP transect time, location, and approximate total flow.

Figure 2-3 presents historical daily mean flows from USGS gauge #14211720 located at the Morrison Street Bridge on the Willamette River in Portland. Data from October 1972 to September 1994 were computed using velocity measurements from an acoustic velocity meter. Data after September 1994 are based on estimated flows by the USGS. No estimates were located after 2001. The USGS plans to install an acoustic velocity meter on the Morrison Street Bridge during the 2003 water year, which should be operational by summer 2003 (Kittelson 2003).

Figure 2-3 references the 70,000-cfs flow under which the 2002 ADCP survey was conducted. Average flow ranges from 58,000 cfs in winter (December through March) to 9,000 cfs in late summer (July and August). Peak events can trigger flows in excess of 150,000 cfs, with maximum flows over 400,000 cfs (1996 winter flood).

Figure 2-4 is a vector plot of the water-column-averaged velocity, magnitude, and direction at transect 4 at RM 3.1, located at the entrance to the Multnomah Channel. Figure 2-5a illustrates a color plot of the velocity magnitude, and Figure 2-5b presents the projected velocity perpendicular to the transect. These data indicate that close to

one-half of the total flow (35,000 cfs) was being diverted down Multnomah Channel during the ADCP measurement period.

Parameters that would affect total flows and the amount of flow diverted down Multnomah Channel include relative stage of the tides in St. Helens and Portland, flow in the Columbia River, and Willamette River flow into the Portland Harbor. The velocity depicted in Figure 2-5b is the result of only using the velocity component perpendicular to the transect. This is further illustrated by the vector plot in Figure 2-4, which depicts the diversion of flow into Multnomah Channel. Flow into the Multnomah is likely greatest when low river stages at St. Helens and the Columbia correspond with high stages in the Willamette; this was the situation during the ADCP survey on April 19, 2002. It is unclear how often this occurs, but the interactions of these factors over time will be evaluated as part of the hydrodynamic modeling of the system. Figure 2-5b also reveals some variation in velocity with depth in the shallow water entrance to Multnomah Channel on the west side of the river and a back eddy effect on the east bank.

Figure 2-6a presents ADCP data at transect 11 at RM 8, just downstream of Swan Island and the Portland Shipyard. Both the vector plot (Figure 2-6a) and velocity profile (Figure 2-6b) reveal a sharp drop in velocity behind Swan Island and a small back eddy into Swan Island Lagoon. The velocity profile in Figure 2-6b also illustrates some vertical structure with increased flows in the upper water column in mid-channel.

Figure 2-7a presents the measured ADCP data at transect 14 at RM 9.6 across the deep dredged hole off of Swan Island. An increase in the water column average velocities can be seen in Figure 2-7b. A back eddy can be observed in both the vector plot and the velocity profile. The velocity profile also shows strong near-bottom velocities in the hole with increased velocity toward the water surface.

2.3 BATHYMETRY

As part of the pre-AOC RI/FS studies, a multibeam bathymetric survey was conducted of the LWR from the confluence with the Columbia River to RM 15.6 (upstream end of Ross Island; see Map 1-1). The primary goal of the survey was to develop an accurate, baseline, riverbed elevation database for this portion of the LWR. This precise bank-to-bank bathymetric survey was conducted by DEA between December 13, 2001 and January 14, 2002, during the winter period of relatively high water. The vertical accuracy of the water depth measurements was specified at less than or equal to 0.5 foot (NAVD88), and the horizontal accuracy was set at less than or equal to 1 meter. The data were processed using a 1-meter grid size to generate a digital terrain model, and the survey results were plotted in both hillshade and contour formats. A bathymetry report detailing the methods used and the survey results has been provided to EPA under separate cover (DEA 2002a).

Map 2-2 provides a summary of the baseline bathymetric survey results and shows LWR bed elevations as of January 2002. [Higher resolution maps are provided in DEA (2002a).] From RM 0 to 11.6 (Portland Harbor), elevations in the federal navigation channel are generally 40 to 50 feet in depth. Several deep holes, particularly off Terminal 4 and Swan Island, reach 70+ feet in depth; these are borrow areas dredged in the past to provide fill to create the adjacent uplands. Most of the ISA is characterized by relatively steep slopes from the riverbank to the authorized channel depth (~ 40 feet). The broadest gradually sloping areas that extend from 0- to about 30-foot depth occur off Sauvie Island from RM 0 to the Multnomah Channel, at the head of Swan Island Lagoon, and along the west side of the river between Willbridge Terminals and Terminal 2. Upstream of the federal channel, river bed elevations are more variable and generally follow the river bed morphology, with the deeper areas (40+ feet) occurring on the outside of the river bends and scour features evident downstream of the downtown Portland bridge footings. The side channel east of Ross Island Lagoon is a relatively shallow area (< 20 feet), while the main channel west of Ross Island extends to 60-foot depth in places.

A second bathymetry survey was conducted in the summer of 2002 (DEA 2003). Comparison of the time-series bathymetry survey results allows areas of riverbed that shoaled or scoured between December 2001 and September 2002 to be identified. These results are presented and discussed in Section 2.6.

2.4 PHYSICAL CHARACTERISTICS OF SEDIMENTS

The physical properties of sediments yield significant information regarding the physical dynamics of the river system. Coarse-grained sediments are generally found in erosional areas where water currents remove fine particles from the sediment, while fine-grained sediments typically occur in depositional areas where water velocities are low enough to enable the settling of fine-grained particles.

Grain-size distribution of sediments throughout the LWR was measured in September 2000 during a Sediment Trend Analysis (STA[®]) survey (Map 2-3) (GeoSea Consulting 2001). Surface sediment sampling was attempted at 935 locations from the Willamette Falls at RM 26.5 downstream and into the Columbia River. Of the 935 sampling stations, 99 were classified as “hard ground,” meaning sediments could not be collected after three casts of the grab sampler. As noted by the authors, the actual ground may not have been hard (i.e., bedrock), but rocks and other debris may have prevented the grab sampler from closing.

The distribution of sediment grain sizes in the LWR from this survey shows a predominance of “hard ground” in the upstream reaches of the river south of Ross Island. This pattern may be due to outcroppings of Columbia River basalts in the riverbed in that region (GeoSea Consulting 2001), as well as increased flow velocities due to a smaller cross-sectional area of the river as compared with the ISA. Natural

sediment composition in the LWR is variable. Sand and gravel particles are predominantly quartz, feldspar, or lithic fragments. Lithic fragments are typically basalt.

The grain-size distribution of sediments in the LWR becomes finer downstream, especially where the river widens and/or where water has an opportunity to pool. In general, sandy sediments dominate the riverbed upstream of RM 11, while surface sediments below RM 10 are predominantly silt (Map 2-3). Surface sediment texture between RM 10 and 11 is transitional between the upstream sandy and downstream silty areas. In general, silts dominate surface sediments in Portland Harbor, with localized areas of sandier material occurring at narrower portions of the river, such as in the navigation channel between RM 5 and 7, and at the mouth of the Willamette River where Columbia River sands may be moving into the LWR. Sheltered areas throughout the LWR, such as the Ross Island and Swan Island lagoons, are generally characterized by finer-grained sediments than the adjacent main channel. Some coarser sediments are found near bridge supports in some nearshore or berthing areas; these are likely the result of vessel propeller wash (prop wash). As part of the LWG's pre-AOC studies for this RI/FS, a December 2001 sediment-profile imaging survey of the Willamette River from Ross Island to the Columbia River documented similar grain-size distribution patterns in this stretch of the river (SEA 2002f; see Section 2.5).

2.5 SEDIMENT TRANSPORT AND TRANSPORT REGIMES

River currents, vessel movements, wave activity, and the supply of sediment affect sediment transport in the LWR. Finer-grained sediments (silts and clays) have lower settling velocities and thus tend to remain suspended in the water column longer than coarser-grained materials (ASCE 1975). The quantity of suspended sediment load varies seasonally, with higher quantities delivered by storm or high flow events. USGS measures suspended sediment concentrations at the Morrison Bridge (RM 12.6) gauge approximately once a month, in addition to a few surveys have been conducted at various locations in the Portland Harbor during specific high flow events (Lee 2002).

Figure 2-8 is a composite of long-term suspended sediment data collected at the Morrison Bridge and some short-term, high-flow, suspended sediments measurements upstream of the St. Johns Bridge, which depicts the tendency for increased sediment concentrations in the water column during high flow events. In general, however, the Willamette has relatively low suspended loading during most flow conditions. Furthermore, most of the suspended sediments coming into the Portland Harbor are relatively fine-grained. Some percentage of the sediments remains in suspension and passes through the Portland Harbor, while the remainder tends to settle in depositional areas. Subsequent redistribution of sediments may occur more through bedload transport than by erosion, resuspension, transport, and deposition.

Depending upon the hydraulic conditions during high water events, sediments can be deposited, transported through, or scoured in the lower harbor. For example, with a high Willamette River discharge and a low Columbia River stage, velocities through the Portland Harbor will be high, and critical transport velocities of fine-grained sediments will be exceeded, thus transporting material downstream either as bedload or as resuspended sediments in the water column. Conversely, if the high discharge event on the Willamette River is coincident with a high stage on the Columbia, the velocities in the Portland Harbor will be lower, and suspended or bedload sediments entering the harbor are likely deposited there. Localized and sporadic anthropogenic disturbance or riverbed sediments (e.g., dredging, prop wash) provide an additional mechanism of reintroducing sediments into the water column. Their transport fate would be a function of LWR flows at the time of their disturbance.

A review of a series of historic bathymetric survey overlays of the navigation channel (RM 0 to 11.6), conducted two to three times annually from August 1990 to May 2001 by the Corps, Portland District, indicates that, as expected, channel riverbed elevations are variable in places (Map 2-4). The locations of federal and private dredging areas are also shown on this map, and significant deposition within these deeper areas is evident over time (e.g., near RM 11, between RM 9 and 10, near RM 5, and between RM 2 and 3). The historic bathymetric data evaluation also estimated change in sediment volume by river mile from survey to survey. These results are graphed and presented for all river miles in Appendix D. Figure 2-9 shows the volume changes over time for two segments, RM 4 to 5 and RM 7 to 8. These approximations suggest that a significant volume of sediments is deposited and subsequently transported from different portions of the navigation channel over time.

Although a few models have been developed to analyze water levels, velocities, and water quality in the LWR, no numerical models have been developed for Portland Harbor to specifically examine sediment transport.⁴ The September 2000 STA[®] (GeoSea Consulting 2001), however, provides a broad-scale picture of sediment movement from the Willamette Falls downstream to the river's convergence with the Columbia. The STA[®] methodology statistically examines the relative changes in grain-size distributions that occur along transport paths. Maps are produced that indicate the patterns of sediment transport and areas of erosion, equilibrium, and accretion (Map 2-5).

The STA[®] analysis concluded that sediments in transport or those discharged from outfalls into the system from Willamette Falls downstream to about the Fremont Bridge (RM 11) are essentially in dynamic equilibrium or "conveyor-belt" movement downstream (Map 2-5). Below the Fremont Bridge, sediments are finer and the transport environment becomes depositional. The analysis concluded that the main stem of the river between RMs 7 to 10 is a depositional sink for sediments.

⁴ The LWG is planning to develop a hydrodynamic and sediment transport model of the LWR as part of this RI/FS (see Section 2.6.2).

Downstream of this reach from about RMs 7 to 3.5, another conveyor-belt sediment transport regime is present. From RMs 3.5 to 1, the transport environment is classified as a mixed case (i.e., there are alternating periods of deposition and erosion). Finally, where the Willamette enters the Columbia River system at RMs 0 to 1, the STA[®] analysis suggests that dynamic equilibrium and/or erosion dominate this portion of the river.

The STA[®] analysis infers sediment transport dynamics from surface sediment grain-size distributions for the time frame represented by the surface grab samples, which is unknown and likely varies spatially throughout the system. The effects of infrequent, large-scale events, such as 10+ year floods, on sediment movement within and out of the LWR have not been described, although the historical data shown in Figure 2-9 and Appendix D suggest that the February 1996 flood event resulted in significant deposition of sediments in many portions of the navigation channel.

The results of STA[®] survey and the historic bathymetric data evaluations were compared in SEA (2002b). This comparison was limited to the navigation channel within the ISA and reached the following conclusions:

- The channel in the ISA from approximately RM 9 to approximately RM 7 is a net depositional area, while the rest of the ISA channel area (from RMs 7 to 3.5) is predominantly a system that is in dynamic equilibrium, with localized areas of deposition and erosion.
- Deposition rates in depressions and in the depositional area from RMs 7 to 9 consistently fall between the range of 0.5 to 1 foot /year; most of this deposition occurs in bathymetric lows (commonly associated with dredging or borrow areas) and along the inside bends of the river.
- Erosion is most consistent outside of the ISA, but occurs within the ISA in localized areas such as along the outside bends of the river. Episodic erosion occurs based on short-term hydrologic events; however, periodic dredging can obscure actual events of erosion in the bathymetric depth difference analysis.

Two other pre-AOC efforts, the December 2001 multibeam bathymetric survey and sediment-profile image (SPI) surveys (DEA 2002a; SEA 2002f) from Ross Island to the Columbia River, provide results that are consistent with the broad sediment movement patterns described by the STA[®]/bathymetry data comparison. In addition, these results provide information on surface sediment dynamics in areas beyond the ISA and in particular, in shallow, nearshore areas outside of the navigation channel. Based on the mapped SPI/bathymetry results, eight major benthic condition zones were defined in the Willamette from Ross Island downstream (Map 2-6).

Seven of these zones occur upstream to downstream in the main stem or channel of the river (deeper than –20 feet CRD), where the sediment transport regime appears primarily controlled by physical factors, specifically river shape, width, and flow. These factors appear to govern the types of sediments seen within the main channel, substrate stability and heterogeneity, and possibly the soft-bottom benthic community structure. The eighth zone, which occurs in nearshore areas (all areas shallower than –20-foot-depth CRD along both margins of the river), represents areas in which the conditions observed at any particular location vary as a function of small-scale variations in river morphology/dynamics, bank treatments, and river use. The general characteristics of each benthic zone delimited in Map 2-6 are shown in Table 2-4.

Overall, the evaluation of historic bathymetry data and the results of the STA[®] and SPI surveys produce a consistent picture of sediment transport regimes in Portland Harbor. These data and the direct measurements of elevation changes discussed below form the basis of portions of the physical CSM detailed in Section 5, and provide an important foundation for scoping key elements of the RI such as the distribution of chemicals in sediments.

2.6 RIVERBED ELEVATION CHANGES (2001-2002)

The second bathymetric survey conducted by DEA in the summer of 2002 was to directly measure seasonal changes in riverbed elevations that had occurred since the previous winter (DEA 2003). The survey was conducted in two phases: RMs 2 to 11 were surveyed between July 3 and 18, 2002, and RMs 0 to 2 and RMs 11 to 15.6 were surveyed between September 16 and 20, 2002. The summer 2002 data were processed in the same manner as the winter 2001/2002 data (Section 2.3) and updated contour and hillshade maps were generated. In addition, a set of elevation difference maps that show the riverbed elevation changes that occurred over the 9-month period from December 2001 to September 2002 were generated (Map 2-7a-k).

As shown in Map 2-7, the elevation change maps were created by overlaying the 1-meter cells from each survey and subtracting the winter 2001/2002 data from the summer 2002 data to generate a direction and magnitude of change for each cell. The vertical resolution of the multibeam survey overlay was ± 0.25 foot, so cell comparisons that show positive or negative change less than or equal to 0.25 foot represent no discernable change in riverbed elevation.⁵ Because the winter 2001/2002 data were subtracted from the summer 2002 data, negative elevation changes (shallower in summer compared to the previous winter) indicate shoaling and positive elevation changes (deeper in summer compared to the previous winter) indicate deepening. In Map 2-7, the no-change areas are shaded gray, while shoaling

⁵ The survey vertical accuracy specification of ≤ 0.5 foot was exceeded for both individual surveys. An analysis of bathymetric change data indicated that the vertical resolution of the survey overlay was ± 0.25 foot for approximately 80% of the data (DEA 2003). Therefore, this interval was used as the no-change category.

areas (negative change) are shown in yellow to orange shades, and areas that deepened (positive change) are shown in blue shades.

As shown in Maps 2-7a-k, sediment accretion and erosion occurred in various parts of the LWR between December 2001 and September 2002. Some general sediment movement patterns include:

- Areas of shoaling and deepening occur more frequently in off-channel, shallow nearshore areas than in the main navigation channel.
- River zones that were inferred to be higher energy zones based on the STA[®] and SPI summarized above (e.g., above RM 12 and between RMs 5-7) show numerous small-scale changes from bank-to-bank.
- Zones that were inferred to be lower energy (e.g., RMs 3-5, 7-9) show fewer small-scale changes in the channel.
- In some places, bedforms (e.g., at RM 5-6 and RM 11-12) can be seen propagating downstream (alternating high and low spots).
- Deposition or in-filling of some former in-channel dredged or borrow areas (e.g., at RMs 2, 5.2, and 9-10) is evident.
- The most extensive stretch of nearshore deepening extends along the west side of the river from RMs 0 to 3; this appears to be a natural sediment erosion pattern.
- The most extensive stretch of nearshore shoaling extends along the west side of the river from RM 4 to 5; this appears to be a natural sediment shoaling area.
- Bridge footings create localized areas of deep scour and accretion (e.g., the Railroad Bridge at RM 7).
- Many areas of deepening appear to be closely associated with pier structures, berthing areas, and slips (e.g., Terminal 4, Portland Shipyard, Willbridge Terminals); it is likely that much of this sediment movement is the result of anthropogenic factors (e.g., prop wash).
- Some recently dredged areas (e.g., at RM 10 off Terminal 2) are evident.

2.6.1 Patterns in the Distribution of Shoaling and Deepening Areas in 2002

The bathymetry change data shown in Map 2-7 are tabulated by river mile in Table 2-5a for shallow nearshore areas and in Table 2-5b for the deeper main channel areas. The definition of the nearshore and channel areas is based on the results of the

December 2001 SPI survey (SEA 2002f). As indicated in Section 2.5, the sediment transport regimes inferred from the SPI results in the deeper portions of Portland Harbor (navigation channel and lower channel slopes) differed notably from those inferred for the nearshore areas (upper channel slopes, off-channel benches and beaches). The division between these “channel” and “nearshore” areas was delineated by the –15-foot NAVD88 contour that equates approximately to the –20-foot CRD contour in the survey area. The nearshore area defined by the NAVD88 15-foot contour is shown in Map 2-8.

Table 2-5 lists the numbers of square meters in each river mile that show no change, shoaling, and deepening across the full range of vertical change intervals observed. The no-change category is defined as ± 0.25 foot based solely on the vertical resolution of the overlain bathymetry measurements. The percentage of the area within each river mile that fits into each of these three categories is shown at the bottom of Tables 2-5a and 2-5b, and cumulative shoaling and deepening percentages by change interval are tabulated on the right. The percentage of the area within each river mile showing no change, shoaling, and deepening is graphed on Figure 2-10. Several general trends are evident:

- First, consistent with the patterns on the bathymetry change maps, the proportion of each river mile that shows no change (gray bars) is substantially greater in the channel areas (Figure 2-10b) than nearshore areas (Figure 2-10a).
- Second, in nearshore areas (Figure 2-10a), the percentage of the river exhibiting shoaling (green bars) peaks between RMs 4-5 and 10-11; these are reaches identified as “depositional zones” based on the SPI survey data (SEA 2002f). Channel shoaling peaks are less distinct than the nearshore peaks, but also occur in the “depositional zones” at RMs 1-2, 4-5, and 9-10, as well as in an upstream area around Ross Island (RM 14-15.7).
- Finally, in the nearshore areas, the percentage of the area that deepened (red bars) peaks at RMs 0-3 and 11-13. In channel areas, the peaks in deepening occur at RMs 2-3, 5-6, 11-13 and 14-15.7. The upstream (RMs 11-13) and mid-reach (RMs 5-6) areas were identified as “transport zones” based on the STA[®] (GeoSea Consulting 2001) and SEA (2002b) results. The peak in deepening in the nearshore downstream areas (RMs 1-3) appears to reflect the large, contiguous zone of erosion that is evident along the west side of the river from RMs 0 to 3 (Map 2-7a and 2-7b).

The data compiled in Tables 2-5a and 2-5b allow the total percentage channel and nearshore areas that either deepened or shoaled to be quantified.

Channel Areas. Across all channel areas combined, approximately 65.9% of the riverbed shows no change in elevation between the two surveys, while 22.5% of the area deepened measurably and 11.6% shoaled. The cumulative percent of the channel area that is shoaling and deepening by vertical change interval is also provided in Table 2-5b. For both shoaling and deepening, over 90% of the cells that exhibit vertical change show change that is less than or equal to 1 foot in magnitude, and over 98% of the cells show vertical change that is less than or equal to 2 feet. When the no-change cells are included in the calculation (i.e., the sum of the no-change cells and the shoaling/deepening cells ≤ 1 foot over the total cell count), only 2.8% of the total area of the channel shows vertical change (either shoaling or deepening) greater than 1 foot. This represents a total channel area of about 260,000 m².

Nearshore Areas. Across all nearshore areas combined, approximately 43.3% of the riverbed shows no change in elevation between the two surveys, while 40.3% of the area deepened measurably and 16.4% shoaled. The cumulative percent of the nearshore area shoaling and deepening by vertical change interval is shown in Table 2-5a. The magnitude and the extent of vertical change are greater in nearshore areas than offshore. Still, over 75% of the cells that exhibit vertical change show change that is less than or equal to 1 foot, and over 93% of the cells that show vertical change show change that is less than or equal to 2 feet. When the no-change cells are included in the calculation, the percentage of the total area of the nearshore riverbed that shows vertical change (either shoaling or deepening) greater than 1 foot is approximately 13.4%. This represents a total nearshore area of about 215,000 m².

2.6.2 Temporal Considerations

The vertical changes in riverbed elevations that were measured by the LWG cover an 8 to 9-month period from January to September, 2002. Because changes in riverbed elevations are assumed to be directly influenced by river flow, an analysis of river stage height data was also conducted. The 2002 river stage height year is included on each water year plotted in Figure 2-2 for comparison purposes. Visual examination of Figure 2-2 indicates that the January to September period in 2002 was relatively typical in terms of river stage heights compared with the same period in other years since 1973 for which there are relatively complete river stage data. The January to September 2002 river stage pattern was similar in magnitude to that observed in 1978-80, 1985, 1987, 1989, 1990, 1993, 1995, 2000, and 2003, notably less than the January to September river stages observed in 1974-76, 1981-84, 1986, 1996, and 1997-1999, and notably greater in magnitude than the river stages measured in 1973, 1977, 1988, 1994, and 2001. For the 30-year period from 2003 to 1973 only 28 year-to-year comparisons could be made because there are no data for 1991 and 1992. Based on those data, the 2002 river stages were either greater than or similar to the river stages observed in other years 57% of the time (16 years), and were less than the river stages observed in other years 43% of the time (12 years).

In reviewing the river stage data in Figure 2-2, note that LWR flood stage is +18 feet CRD (18.3 feet PRD), and the ordinary highwater mark in the LWR is approximately +15 feet CRD (15.3 feet PRD).

The patterns of sediment movement measured over the 8-9 month period in 2002 are consistent with the understanding of sediment transport regimes in the system based on the work conducted during the planning phases of the RI/FS (GeoSea Consulting 2001; SEA 2002b,f). In addition, the scale of the observed elevation changes is consistent with the annual depositional rates of 0.5 to 1 foot/year estimated by comparing historical dredge records from the navigation channel for the 10-year period 1990-1999 (SEA 2002b). Additional activities currently undertaken or planned by the LWG to verify and expand this understanding of the Portland Harbor physical system are listed below and discussed further in Section 7.1:

1. A third multibeam survey of the Portland Harbor was conducted in May 2003 to provide a third data set in the bathymetry time series. The riverbed elevation changes from winter 2001 and summer 2002 were compared with the spring 2003 data (SEA and DEA 2003). The spatial patterns and magnitude of bathymetric changes seen between May 2003 and the summer of 2002 were comparable to those described above for the period from the winter 2001 to the summer 2002.
2. A fourth multibeam bathymetric survey, including ADCP flow measurements was initiated in February 2004 following a relatively high flow (~ 140,000 cfs) event on the LWR. The riverbed elevations observed immediately following this event will be compared to previous survey data as a direct measure of riverbed elevation changes following a high energy event.
3. A hydrodynamic and sediment transport model of the LWR will be developed in 2004 pending approval of the proposed modeling approach described in the modeling technical memorandum submitted to EPA in February 2004 (West Consultants 2004). This model will be developed, calibrated, and validated using the physical data (e.g., time-series bathymetry, flow measurements, sediment characteristics) available prior to the Round 2 data collection efforts. The model will be refined based on additional physical data (e.g., sediment surface and core data) collected in Round 2. The model is designed to allow long-term predictions of sediment movement during hydrological events (i.e., floods) that will not likely be experienced during the RI/FS. Additional details on how the model results will be used in the RI/FS are provided in Sections 6 and 7 of this work plan.

2.7 DREDGING

Dredging records for the Portland Harbor were requested from the Corps, the Port of Portland, and private entities. Data for dredging projects from 1980 through 2001 were obtained from the Corps, Portland District, and from the Port of Portland and are compiled in Table 2-6. For federal and Port dredging projects, Table 2-6 lists the year dredging occurred, the dredging location, the purpose of the dredging, and the quantity of dredged sediment. Map 2-2 identifies the approximate dredging location for most events. For the purposes of presentation, dredging area boundaries have been grouped into two intervals (1980-1991 and 1992-present), in order of occurrence. However, the areas identified as private dredging on the figure are approximations of dredge borrow site locations. The dredge borrow sites were identified by comparing pre- and post-dredge hydrographic surveys of the sites. Some recently dredged areas are also evident on the bathymetric survey difference maps presented in Map 2-7a to k (e.g., the Port of Portland's Terminal 2 dredging prism just upstream and downstream of RM 10; Map 2-7g and 2-7h). A compilation of available dredging permits issued by the Corps, pending permit applications, or permits to be issued by the Corps during the implementation of the RI/FS will be included in the RI. This information will also include third-party permits.

Review of the data in Table 2-6 indicates that from 1980 to 2001 about 95% of the maintenance dredging (on a cubic-yard basis) had occurred between RMs 8 and 10, the main Portland Harbor depositional zone. The next largest percentages, approximately 2% and 1%, occurred in the downstream depositional zones at RMs 4 and 2, respectively. The remaining 2% of the maintenance dredging has been spread throughout the other portions of the Portland Harbor. This historical pattern in federal and Port dredging needs further supports the sediment transport regimes described previously.

3.0 CHEMICAL SOURCES

This section discusses potential current and historic sources of chemicals released to sediments in the ISA. It is intended to be a summary of currently recognized potential sources, not a definitive discussion of all possible sources of chemicals to the ISA. Ongoing sources to the ISA are likely a combination of the different types of sources discussed in this section. The magnitude of ongoing sources may vary spatially and temporally.

As required by the SOW, the LWG “will identify source areas that are contributing to contamination to the in-water portion of the Site. Although DEQ is primarily responsible for the control of upland contaminant sources to the Site, as part of the RI/FS, Respondents [the LWG] shall evaluate the distributions of sediment contaminants and, if appropriate (e.g., if the sediment data suggests the presence of an ongoing source), make recommendations to EPA and DEQ if the need for further investigation or control of sources is identified.” Information provided in this section will be augmented by background source information to be provided in the updated CSM report.

3.1 CURRENT AND HISTORICAL INDUSTRIAL ACTIVITIES

Current or historical industrial activities and processes that may lead or may have led to either point or nonpoint releases to the ISA include petroleum storage and distribution; chemical (e.g., pesticide, herbicide, asphalt, paint, resins, acetylene) manufacturing and formulation; other manufacturing (e.g., laminated wood products, windows, refractory brick, silicon chips); oil gasification; pole treating; metals salvage and recycling (e.g., metals, batteries, oils, solvents, and automobiles); metals forging, fabrication and plating; storage and warehousing of various goods; marine fueling, construction and repair; electrical power generation; electrical substation operation and maintenance; railroad switching, fueling and maintenance; and shipping. In addition, Portland Harbor was the site of extensive shipbuilding and repair throughout World War II. Shipbuilding facilities were constructed beginning in 1941 (Osborn 1945).

Types of chemicals that may have been (or are being) released from facilities within the ISA include petroleum products, polycyclic aromatic hydrocarbons (PAHs), other semivolatile organic compounds such as phthalates and pentachlorophenol (PCP), polychlorinated biphenyls (PCBs), organic solvents, perchlorate, pesticides, herbicides, dioxins/furans and metals. Antifouling agents such as butyltins have also been released to the river in areas of commercial vessel traffic.

Table 3-1 includes a list of potential chemical sources within the ISA. The types of industries associated with specific chemical uses or chemical types are summarized in Table 3-2.

Facility-specific information on operations and potential chemical use or release is contained in Appendix E. The DEQ Environmental Cleanup Site Inventory (ECSI) database and nearly 40 Strategy Recommendations prepared by DEQ were reviewed to generate information on facility operations, possible chemicals of concern associated with the processes that would be anticipated, and pathways to the ISA. Results of this review for the facilities that received EPA General Notice Letters are provided in Appendix E, Table E-1. The information in Table E-1 is considered preliminary, and site-specific data may be available that more specifically addresses upland sources. Facility locations are shown on Map 1-2a-g

3.2 DISCHARGE OUTFALLS

Locations of outfalls compiled by the City of Portland Bureau of Environmental Services (1998) are shown in Map 3-1. General information on the types of dischargers to the LWR is summarized below. Drainage basins for City storm drains and combined sewer overflow (CSO) locations are also shown in Map 3-1. More detailed descriptions and evaluations of the city's outfalls, drainage basins, and facilities discharging to these outfalls are contained in a report compiled by CH2M Hill (2000b,c).

There are approximately 94 National Pollutant Discharge Elimination System (NPDES)-permitted discharges to the ISA⁶. Many of these permitted facilities discharge to the City's stormwater system. NPDES permits issued to facilities in the ISA are listed in Table 3-3; NPDES permits in the LWR outside of the ISA are listed in Table 3-4.

The types of permitted discharges in the ISA include industrial process wastewater, contact and non-contact cooling waters, treated water from cleanup projects, and stormwater from municipal sources, construction sites, and industrial facilities. Nearly all the ISA permittees are industrial dischargers classified as minor. There are no municipal sewage treatment plant discharges in the ISA.

Stormwater throughout the ISA drainage is collected and routed through stormwater collection systems and discharged at outfalls. There are approximately 234 non-City stormwater outfalls within the ISA (see Appendix E, Table E-2). There are about 13 City stormwater outfalls and four CSOs, with a high level of separation, within the ISA (Map 3-1). The City stormwater outfalls and CSOs generally drain large areas with multiple facilities within each drainage basin. CSOs only discharge sewage to the river during storm events when runoff combined with sewage flows exceeds the capacity of the wastewater collection and treatment system. The four combined basins in the ISA have been separated to prevent CSO discharges into the river except for storms exceeding a 3-year summer storm.

⁶ 85 general and 9 individual NPDES permits

DEQ issues and enforces NPDES permits in Oregon. The permits set discharge limits or guidelines and specify the frequency and type of monitoring data that must be collected. Monitoring requirements are based on the size and type of facility and typically include basic parameters such as flow and pH. They may also include chemicals of concern at a given facility or bioassays. Chemical monitoring requirements for individual NPDES permittees in the ISA are summarized in Table 3-5. Examples of NPDES general monitoring requirements are listed in Table 3-6, although these requirements may be modified to address specific facility concerns. Individual permit limits may be based on either effluent concentrations or total loadings and may incorporate factors such as mixing zones or available technologies. Industrial stormwater discharges with general permits do not have flow or chemical limits. Instead, benchmark concentrations are established to assist permittees in evaluating the effectiveness of their stormwater management practices (Table 3-7).

Facilities are required to submit discharge monitoring data to DEQ. Currently, DEQ does not have an electronic database for discharge monitoring reports, although some facilities have begun submitting discharge monitoring reports electronically. In general, little or no quality assurance information is provided with the data submitted on the discharge monitoring report. Repeated violations of reporting requirements or exceedances of discharge limits may result in an enforcement action. Information on NPDES-related enforcement actions for permitted industrial and municipal dischargers in the ISA was compiled from 1995-2000 annual reports of the DEQ Office of Compliance and Enforcement (DEQ 2000a), and is summarized in Table 3-8.

The City entered into a memorandum of agreement (MOA) with DEQ for administration of NPDES General Permits 1200-Z, 1300-J, 1200-COLS, and future General Permits for Industrial Stormwater for those facilities located within the City of Portland that discharge to receiving waters and to the municipal stormwater system. As part of the MOA, the City reviews the facilities' stormwater pollution control plans, conducts independent stormwater sampling, and conducts inspections to ensure compliance with the plan and permit conditions.

3.2.1 Stormwater Runoff

Stormwater runoff to the ISA is discharged almost entirely via stormwater outfalls. However, there is some overland flow of water from properties immediately adjacent to the river. The volume of overland flow is small relative to the amount of stormwater discharged via outfalls.

Stormwater runoff can transport contaminated soils, wastes, or spills from areas throughout the drainage basin. Some potential sources of chemicals in runoff from the urban residential and commercial areas are pesticide and weed control products, leaking transformers, hydraulic and lubricating fluids, petroleum products, erosion,

street dust, and deicing salts. Heavy metals, PAHs, and pesticides are some of the priority pollutant constituents found in urban runoff (Tetra Tech 1992; EPA 1983). For example, among the chemicals exceeding water quality criteria in stormwater runoff samples collected in Portland (at I-84 and at Harbor Way) in 1994 were cadmium, chromium, copper, lead, zinc, benzene, heptachlor, dieldrin, malathion, PCBs, and total dichloro-diphenyl-trichloroethane (DDT) (Anderson et al. 1996).

Numerous stormwater controls throughout the drainage basin were instituted over the last decade. The City of Portland and many facilities are now required to have NPDES permits for stormwater discharges, as well as stormwater management plans that incorporate best management practices (BMPs) to reduce the amount of pollutants in stormwater runoff. Monitoring is required, and although NPDES general stormwater permits do not generally set discharge limits, there are guidelines or benchmarks that are used to evaluate the effectiveness of stormwater controls. Common BMPs include removing industrial activities from exposure to rainfall and stormwater runoff, catch basin cleaning, street sweeping, and stormwater treatment (e.g., oil/water separators and other technologies).

NPDES stormwater monitoring data are submitted to DEQ. As with all NPDES monitoring data, information is compiled in individual facility files. The City of Portland Bureau of Environmental Services also maintains an electronic database of stormwater monitoring data for NPDES permits that it administers. Stormwater data for facilities within the City's outfall basins have been compiled for each City outfall (CH2M Hill 2000b,c).

3.2.2 Combined Sewer Overflows

The volume of CSO discharged from Portland's combined sewer system has been reduced as a result of stormwater controls and improvements to the combined and stormwater collection system (CH2M Hill et al. 1994). CSO overflows typically consist of 80% stormwater but also contain untreated sewage. Prior to 1994, the CSO system discharged an average of 4.8 billion gallons of untreated CSO (stormwater and sewage) to the Willamette River between RM 4 and 17 (CH2M Hill et al. 1994). The Cornerstone and Willamette CSO control projects helped Portland to achieve a 42% annual average CSO reduction in the Willamette system as of December 2001. By December 2011, the City's CSO program will achieve a 95% annual average reduction in the LWR.

Within the ISA, the CSOs experienced an average of 50 overflow events (up to a total of 112 days) per year in the early 1990s before the Cornerstone and Willamette CSO control projects in the ISA were implemented (City of Portland Bureau of Environmental Services 1998). Since 1997, CSO discharges in the ISA have been reduced to an average of three events per year, discharging about 1 million gallons annually. This represents an approximate 97% reduction of annual average CSO events within the ISA.

3.3 GROUNDWATER DISCHARGE

Extensive groundwater data have been collected from upland facilities throughout the ISA through site investigations conducted under Voluntary Cleanup Program agreements and consent or unilateral orders with DEQ. Approximately 83 sites have been identified on the DEQ ECSI database between RM 2 and 11. Of these sites, approximately 67 are known to have some groundwater quality data (Map 3-2).

There are abundant data from explorations at many sites that document groundwater conditions adjacent to the river, including hydrostratigraphy, groundwater gradients, and groundwater quality. The LWG is currently completing a review of available groundwater data to assess the locations and types of chemicals of interest (COIs) in groundwater adjacent to the ISA and to identify data gaps. For the purposes of this study, COIs are chemicals that have been detected in upland groundwater and have not been screened relative to potential impacts to the ISA using risk-based criteria. The existing data indicate that shallow and intermediate system groundwater under sites within the ISA generally discharges to the river. Direct evidence of discharge of groundwater containing COIs to the river is available at some sites along the ISA. Other sites have been identified as potential sources of COIs to the river via groundwater discharge; however, data are not available to verify whether or not contaminated groundwater is discharging at these locations.

Information on the groundwater physical system and existing groundwater quality data has been compiled from DEQ files and published literature, and will be submitted as part of the updated CSM report. The original documents obtained from DEQ on which the conclusions in this report were based will be provided to EPA for purposes of verifying the conclusions.

3.4 SPILLS

Spills are inadvertent, intermittent releases that occur directly to the waterway or adjacent upland areas. Spill records for the LWR were obtained from DEQ for the period 1995 to 2002 and are contained in Appendix E, Table E-3. Additional records of spills from the 1940s to present were requested from the U.S. Coast Guard and the National Response Center's (NRC) centralized federal database of oil and chemical spills. Detailed reports of spills from 1990 to present were provided, and summary information for spills from 1982 to 1989 was obtained from the NRC online database. These records are also contained in Appendix E.

Information on spill locations, particularly in the earliest reports, is often very general (e.g., RM). Spills reported in the LWR ranged from dropped bottles or sheens from unknown sources to fuel spills of over 500 gallons from vessels. Four of 20 spills reported to the U.S. Coast Guard between 1990 and 2003 involved volumes greater than 5 gallons. Of these four spills, one was greater than 1,000 gallons and was due to operator error while transferring fuel oil from a barge.

Additional historic spill information from transfer and handling practices or overwater activities is sometimes available in site-specific upland site assessments or remedial investigations. Spill information from these documents, when available, will be summarized in an updated CSM report.

Some of the types of activities commonly associated with spills are briefly described below:

- **Product Transfer and Handling.** The types of facilities on the LWR and products or chemicals associated with these industries are listed in Appendix E. Many facilities are now required to have spill prevention plans and have instituted practices to reduce spills.
- **Overwater Activities.** Overwater activities, including ship repair or vessel refueling, are potential sources of chemicals to sediments. Regulations and BMPs have reduced contributions from these activities in recent years. Currently, DEQ spill reports indicate that fuel spills during refueling are the most common type of spill from overwater activities, but small spills during transfer of other materials (e.g., paint) have also been reported.
- **Utility Crossings.** Pipelines carrying petroleum products have the potential to leak or break. There is one petroleum pipeline crossing the Willamette River within the ISA. It is located between the Willbridge bulk fuel terminal and south end of Triangle Park (approximately RM 7.7) (Maps 4-3b to 4-38b).
- **Vessels.** An average of 20 spills from vessels directly to the LWR are reported to the U.S. Coast Guard each year (NRC 2002). Nearly all involve diesel fuel, gasoline, hydraulic or lubricating oil, or waste oil. Vessels may also release bilge or ballast water to the river.

DEQ has developed spill rules that identify the emergency response actions, reporting requirements, and follow-up actions required in response to a spill of oil or hazardous materials. DEQ has also included spill records in its evaluation of potential contaminant sources to the LWR.

3.5 BANK EROSION

The majority of the ISA is industrialized with modified shoreline and nearshore areas. Wharves and piers extend into the channel, and bulkheads and riprap revetments armor much of the riverbank. The Portland Bureau of Planning mapped the banks of the Willamette River from the mouth to Ross Island (RM 15). They calculated that

50% of the banks were riprap, sea walls, other bank stabilization coverage, or structures. Remaining areas consisted of natural material (rock outcrops or native earth material with varying living or dead vegetation), river beach, or unclassified fill. Areas of unprotected shoreline where soils or fill containing chemicals may erode and be washed into deeper areas of the waterway are potential sources of chemicals to sediments. Some shoreline areas with known or suspected contaminated bank soils are located adjacent to ATOFINA, Crawford Street, GASCO, Linnton Plywood/Columbia River Sand and Gravel, and McCormick and Baxter facilities.

3.6 CHEMICAL LEACHING FROM COATED SURFACES

In-water structures, such as docks, pilings, dolphins and bulkheads, may be constructed of wood treated with creosote, chromated copper arsenate, or copper zinc arsenate. These preservatives are sources of PAHs, copper, chromium, arsenic, and zinc to sediments either through direct contact or via the water column. Sites with treated wood structures may have nearshore sediments potentially affected by chemical leaching; however, impacts are generally limited to the immediate area. For example, the spatial impact of creosote-treated wood, based on increases in sediment PAH, was less than 33 feet for small structures (i.e., less than 50 pilings); the spatial impact of leached metals to sediment was limited to within 10 feet (Poston 2001).

Leaching from vessel hull paints is a potential source of trace chemicals to sediments in areas with vessel activity (e.g., marinas, boatyards, shipyards) (Young et al. 1979; Crecilius et al. 1989). Antifouling pigments make up from 2% to 60% of the volume of a gallon of commercial marine paint (Burch 1987). Fouling marine organisms are killed as these pigments gradually leach out into the water. Antifouling paint and bottom primer components include cadmium, chromium, copper, lead, and zinc (Michelsen et al. 1996; Young et al. 1979). Historically, the most common antifoulants were organotins including tributyltin (TBT) and various mercury compounds. Use of mercury and TBT in antifouling paints has been restricted in the United States since 1972 and 1988, respectively, but ongoing sources include shipping traffic from countries without regulations and domestic vessels that are still allowed to use TBT paints.

3.7 ATMOSPHERIC DEPOSITION

Atmospheric deposition occurs both on the land and water surfaces in the ISA. Airborne chemicals deposited on land may be transported to the river in surface water runoff and therefore are associated with storm drain and stormwater runoff.

3.8 UPSTREAM SOURCES

Potential sources that may affect sediment quality in the ISA include all point and nonpoint discharges within the Willamette River basin. Chemicals in discharges and runoff from many diverse land uses in the basin are eventually deposited and mixed in the river by the time the river reaches the ISA.

3.8.1 Non-ISA Sources in the Lower Willamette River

Sources in the LWR, both downstream and upstream of the ISA, may contribute to chemical deposition in the ISA. Industrial and commercial facilities below RM 3.5 include petroleum storage and distribution, steel manufacturing, cement manufacturing, wood products storage and distribution, and marinas. The tidal influence of the Columbia River estuary causes seasonal flow reversals in the Willamette River near its mouth and within Multnomah Channel under certain river stage, river flow, and tidal conditions. These flow reversals could serve to transport sediment-bound chemicals from the downstream reach of the river into the ISA. Industrial and commercial activities immediately upstream from the ISA include aluminum storage, rail yard maintenance and operation, cement manufacturing, and marinas. Shoreline facilities upstream of the ISA that are listed in DEQ's ESCI database are listed in Appendix E, Table E-5, and locations are shown in Figure E-1). Permitted discharges are listed in Table 3-4. The City of Portland manages 34 CSOs upstream of the ISA. There are also numerous private and municipal outfalls upstream of the ISA.

3.8.2 Sources Above Willamette Falls (Upper Willamette River)

There are over 800 permitted discharges to the Willamette River upstream of Willamette Falls. The 28 major point source dischargers to the upper Willamette include over a dozen municipal sewage treatment plants and several pulp, paper, lumber, and fiberboard manufacturers. Hundreds of facilities also have general permits for discharge of non-contact cooling water and filter backwash, gravel mining activities, and tank cleaning. Over 300 permits for industrial stormwater discharge are held by a wide variety of facilities handling products such as paint, steel, metal plating, semiconductors, adhesives or food products, as well as landfills and transportation companies.

Nonpoint sources upstream of Willamette Falls include most of the agricultural and forested land in the Willamette River basin. Forested areas in the Willamette basin are located primarily in the mountains that border the western and eastern sides of the basin. The primary nonpoint source problem associated with forestry is accelerated sediment transport. Forestry practices also contribute runoff containing nutrients, fertilizers, and herbicides. Agricultural land in the Willamette basin is located predominantly in the Willamette Valley, and erosion from agricultural lands is the most commonly cited nonpoint source pollutant in the upper reaches of the

Willamette River basin (Tetra Tech and E&S 1993). Fertilizers, pesticides, and herbicides are agricultural chemical sources of nonpoint source pollution. USGS studies of pesticides in the Willamette basin reported the highest concentrations of organochlorine pesticides and PCBs at three, mostly agricultural, sites (Wentz et al. 1998). Urban areas in the Willamette basin, while a relatively small component of land use in the river above Portland (e.g., Eugene, Salem), may be sources of nonpoint pollutants associated with urban stormwater runoff (e.g., pesticides, PAHs, metals). The upstream reaches of the Willamette River basin also receive runoff from natural volcanic sources and past mining activities, which have resulted in a fish advisory for mercury throughout the entire main stem of the Willamette River.

DEQ's (1998) 303(d) list of impaired waters in Oregon includes the main stem and tributaries of the Willamette River above Willamette Falls. Most of the 303(d) listings for impaired water quality above Willamette Falls are for temperature and bacteria; other listings relate to nutrients, dissolved oxygen, and pH. There are some listings for toxic chemicals. Mercury, PCBs, aldrin, dieldrin, and DDT are listed for RMs 24.8 to 54.8. There are also smaller creeks in the middle and upper Willamette basins that are listed for arsenic, copper, lead, mercury, or zinc.

Based on the 303(d) list, DEQ is currently developing total maximum daily loads (TMDLs) for the 12 Willamette River subbasins (Table 3-9). Nine of these plans are due to be completed by 2003, and allocations have not yet been developed. Mercury is being addressed for the entire basin, and a dioxin TMDL was developed by EPA in 1991 for the Willamette and Columbia rivers.

4.0 SUMMARY OF PREVIOUS INVESTIGATIONS

As mentioned in Section 1, nearly 700 documents and data sets relating to the LWR from the confluence with the Columbia River (RM 0) to Willamette Falls (RM 26.5) were compiled during the preparation of this Work Plan. This section presents a brief summary of the environmental and human uses data. Additional ecological data are summarized in the Ecological Risk Assessment Approach (Appendix B).

The compilation of existing data relied on recent documents and data obtained from many sources, including LWG members, EPA, DEQ, Oregon Department of Fish and Wildlife, USGS, Corps, Oregon Natural Heritage Program, and county and university libraries. An extensive annotated list of data sources, along with data QA/QC information, is provided in Appendix F.

4.1 HISTORICAL DATA QUALITY REVIEW

Data quality reviews were performed for compiled historical sediment chemistry, water chemistry, tissue chemistry, bioassay, and macroinvertebrate data. The reviews were performed prior to entering the historical data into the project database. The purpose of this review was to fully evaluate each data set and categorize the quality of the data in the database, ensuring that these data were appropriate for use in the RI/FS. The two categories of data are as follows:

Category 1. Category 1 data are of known quality and are considered to be acceptable for use in decision making for the Site. There is sufficient information on these data sets to confidently verify that the data, along with associated data qualifiers, accurately represent chemical concentrations present at the time of sampling.

Category 2. Category 2 data are of generally unknown or suspect quality. The QA/QC information shows that data quality is poor or suspect, or essential QA/QC data (e.g., surrogate recoveries, matrix spike/matrix spike duplicates) are either incomplete or lacking.

The evaluation of data quality was conducted at the finest level of detail available for each data set. In many cases, complete QA/QC information was available and individual sample delivery groups could be evaluated. For other data sets, this level of detail was not possible because less backup information was available. The Category 1 and Category 2 designations are made at the finest level possible, which may result in some data from a given study being classified as Category 1 while other data are classified as Category 2. For example, metals data from a survey may be Category 1 while some of the pesticides data are Category 2. In many cases, data from one survey will contain both Category 1 and 2 data. Category 1 and 2 designations were entered into the project database for each sample and analyte.

Analyses upon which project decisions will be based will utilize Category 1 data. As examples, the ecological and human health risk assessments will use select Category 1 data in the risk calculations, and the definition of sediment management areas will rely on Category 1 sediment data. Only Category 1 data that have had an EPA-approved level of data validation, comparable to Washington State Department of Ecology's "QA2" evaluation, will be used for human health or ecological risk assessments. Usability of historical data is discussed in Section 4.6. Category 2 data will be used during project scoping. For example, Category 2 tissue data were used to help identify chemicals of interest, and Category 2 sediment data were used in the initial assessment of trends in chemical concentrations, which was useful for defining the site characterization sampling program.

4.1.1 Chemical Data Quality Reevaluation

During the review of the 2002 Round 1 Work Plan, the agencies emphasized the need to identify as many suitable chemical data points as possible for various components of the RI. In response, the LWG reevaluated historical Category 2 chemical data, and some data were reclassified as Category 1. The results of the reevaluation are presented in a technical memorandum entitled, Historical Chemistry Data Category Reclassification (SEA 2003). This section briefly describes the reevaluation process and its outcome.

The reevaluation focused on three distinct questions with regard to initial classification of the data:

1. Was all information necessary to assess data quality available initially?
2. Were chemical data quality criteria too restrictive?
3. Were criteria applied to data consistently?

The first step in the reevaluation process was to assess the outcome of the initial data quality review provided in Appendix F of the Round 1 Work Plan. It was noted that many surveys with Category 2 classification were lacking appropriate quality assurance/quality control (QA/QC) documentation necessary for data validation. It was also noted that in some cases the lack of chain-of-custody forms was responsible for Category 2 classification of otherwise high quality data. The second step in the process was to obtain source documents for all Category 2 data for the project library. Authors of those studies were contacted (whenever possible) and asked to obtain and transmit the necessary backup information. In the final step, the LWG performed the following tasks:

- Evaluate the adequacy of the chemical quality criteria
- Ensure that data quality criteria were consistently applied to all data, including those classified as Category 1

- Identify any QA/QC information that was either not initially available or that may have been originally overlooked
- Classify data based on newly acquired back-up documentation.

One of the original criteria for evaluation of data quality was revised. A data set was not rejected as Category 1 data based solely on the absence of chain-of-custody documentation as it was during the initial data quality evaluation. The revised process used to assess "traceability" is described in the next section. Additional QA/QC information was obtained for several studies, and chemical review criteria were consistently applied to all QA/QC results, both newly acquired and existing.

For tissue data, one study was upgraded to Category 1 for all chemical groups, and one study became a mixture of Category 1 and Category 2 data. Results of the reevaluation effort and reasons for Category 2 designation are provided in Table 4-1 and Appendix F.

4.1.2 Chemical Data Review Criteria

The chemical data review was conducted by analyte group (i.e., metals, semivolatile organic compounds, etc.) for each matrix type. As a result, a data set may contain all Category 1 data, all Category 2 data, or both categories 1 and 2 data. Data quality was assessed by evaluating the following four factors:

- **Traceability.** Based on the reevaluation of the chemical data, chain-of-custody is preferably documented and complete, and attached to the report or supporting documentation package. However, a data set is not rejected as Category 1 data based solely on the absence of chain-of-custody documentation. If a high-quality data set satisfies all criteria except chain-of-custody documentation, there may either be references to chain-of-custody forms in the text of a report or appendix or there may be other documentation consistent with state or federal guidelines that demonstrate investigators are typically compliant with industry standard field collection and documentation requirements and imply chain-of-custody forms were used. In that instance, an assumption is made that the investigator and contracted laboratories used appropriate sample tracking methods, and the data set is assessed as Category 1.
- **Comparability.** Analytical procedures or methods are identified and are accepted in the industry as "standard" or "universal."
- **Sample Integrity.** Sample holding times and conditions between collection and analysis meet established criteria,

which are generally identified by the EPA Puget Sound Estuary Program (PSEP 1986, 1997a,b,c) or other pertinent and published guidance.

- **Potential Measurement Bias.** Procedural and/or analytical method blanks are available to evaluate potential for introduction of positive bias in reported results, and bias is within acceptable limits. Lower reporting or quantitation levels may be limited by the presence of background or laboratory contamination. Potential measurement bias includes an evaluation of both accuracy and precision:
 - **Accuracy.** Matrix spikes (MS), laboratory control samples, (which may be spiked blanks or other pertinent reference materials), and/or organic surrogate compounds are available for review, and accuracy falls within an acceptable range. Recoveries fall within ranges typically established by major national monitoring programs, regional guidance, or other accepted "standards." Acceptable analyte recoveries tend to be in the range of 50% to 150%. Recoveries measured outside specified acceptance ranges generally result in the qualification of associated analytical results as estimates or unusable/rejected.
 - **Precision.** Replicate samples are generally available to evaluate analytical variability, and variability falls within an acceptable range. However, the lack of replicate data does not preclude Category 1 status as long as other laboratory quality control data to evaluate bias (e.g., blanks and accuracy quality control samples) are available for review to bolster the evaluation. When available, duplicate or triplicate analyses are normally performed at frequencies of 5% or once for every 20 samples analyzed (of the same matrix). Measurement of analytical variability for organic compounds is performed by analyses of MS and matrix spike duplicate (MSD) samples. (Occasionally, MS/MSD analyses are unable to provide desired measurements due to spike levels that were significantly less than native concentrations. This occurs mostly for highly contaminated solids where *in-situ* levels can be extreme compared to spiking levels.) Acceptable replicate analyses in most monitoring programs are less than or equal to 25% to 50% relative standard deviation or relative percent difference. Variability outside acceptance ranges results in the qualification of associated results as estimates.

Data sets that met the criteria above were assigned Category 1.

Sediment

Since March 2003, sediment chemistry results for four studies were added to the LWG's existing chemistry database:

- Lab Data for Phase 1 Data Evaluation and Phase 2 Work Planning for City of Portland Outfall 18 and Lab Data for City of Portland Outfall M-1 (City of Portland 2002)
- Environmental Site Assessment of GATX Terminals Corporation (KHM Environmental Management 1999)
- Forensic Geochemical Assessment of Nearshore Sediments, Remedial Investigation Work Plan, Atlantic Richfield/BP Terminal 22T (SECOR 2002)
- Revised 60-Inch Storm Sewer Interim Remedial Actions, Tosco Willbridge Terminal (KHM Environmental Management 2001).

Data quality reviews were performed for the four newly obtained studies plus 72 existing sediment studies, for a total of 76 sediment studies. Results of the evaluation are provided in Appendix F, Attachment F1, and are summarized in Table 4-1. Of the 76 data sets that were reviewed by analytical group, 36 were classified as Category 1 and 15 were classified as Category 2. Twenty-five surveys contained a mixture of Category 1 and Category 2 data.

Water

The water chemistry data from studies listed in Table 4-1 were evaluated for data quality. Results of the evaluation are provided in Appendix F, Attachment F2 and are summarized in Table 4-1. Data from STORET and LASAR were classified as Category 2. The remaining data sets were classified as Category 1. The lower rating for the monitoring data was primarily due to the lack of QA/QC documentation.

Data collected by DEQ monitoring programs are reviewed for quality assurance, and data in DEQ's laboratory analytical storage and retrieval (LASAR) database are provided with a quality ranking. All data from the LASAR database had been classified by DEQ as Level "A" or better, indicating that there is a Round 1 QAPP approved by DEQ, QA criteria are met, and that the data are suitable for evaluating compliance with water quality standards. The quality of data included in the EPA Data Storage and Retrieval System (STORET) database cannot be easily determined. However, data collected by USGS generally undergo QA/QC review. Data quality reviews of some of the USGS data compiled in this report are reported by Fuhrer et al. (1996) and Anderson et al. (1996). In general, these reports determined that data quality is adequate for use, with the following exceptions:

- Some USGS metals data collected prior to 1992 may be biased high due to contamination of the samples by the field sampling apparatus (Tetra Tech et al. 1993). Therefore, metals data

collected prior to this date were not included in this compilation.

- Caution must also be used in comparing metals results as several different analytical methods were used. Therefore, in this plan the applicable method has been noted wherever appropriate.

Tissue

Data quality reviews were completed for eight surveys, and results are provided in Appendix F, Attachment F3, and are summarized in Table 4-1. All but two surveys were assigned to Category 2. The remaining two data sets were classified as Category 1 and a mixture of Category 1 and 2. In general, insufficient QA/QC documentation was available for the tissue chemistry data sets.

4.1.3 Biological Data Review Criteria

Bioassay and benthic community data quality were evaluated based on validation guidelines and performance criteria from the Puget Sound Estuary Program (PTI 1989).

Bioassay validation guidelines include checks of completeness, holding conditions, standard reporting methods, and QA/QC results for negative control, reference sediment, positive control (reference toxicant), and measured water quality parameters according to standard testing methods. Reference and control performance requirements were as follows:

- **Amphipod.** Control absolute mortality does not exceed 20%; reference absolute mortality does not exceed 30%.
- **Midge.** Control absolute mortality does not exceed 30%; reference absolute mortality does not exceed 35%.
- ***Daphnia sp.*** Control absolute mortality does not exceed 10%.
- ***Lumbriculus.*** On Day 4, numbers of organisms should not be significantly reduced in test relative to control sediment. Organisms should burrow into sediment.

Reference sediment must have similar grain size as test stations.

For benthic community data sets, each study was reviewed for collection, laboratory, and sorting QA/QC methods. Data comparability among benthic data sets was also evaluated by comparing sampling methodology and sampler size, sample processing, and measured endpoints.

Bioassays

Data quality reviews were completed on seven types of bioassays (amphipod survival, midge survival and growth, oligochaete 28-day bioaccumulation (*Lumbriculus*), Microtox bacterial luminescence, *Daphnia* 48-hr and 96-hr mortality, and rainbow trout mortality for surface, subsurface, and sediment porewater spread over 18 surveys (Table 4-9 and Appendix F, Table 5). Four surveys assigned to Category 2, three surveys were assigned a mixture of Category 1 and Category 2 data, and the remaining bioassay data sets were assigned to Category 1.

Benthic Invertebrates

A literature search for information documenting the condition of the benthic invertebrate communities in the LWR found very little peer-reviewed data. Since 1993, only three studies, both inside and outside of the ISA, have focused on both the shallow and deep-water benthic communities in the Willamette River:

- Willamette River Basin Water Quality Study (Tetra Tech 1993, 1995; Tetra Tech and Taxon Aquatic Monitoring Co. 1994)
- Portland Shipyard Benthic Community Study (Dames & Moore 1998)
- Ecological Survey: Fall & Spring 2000 Ross Island Sand & Gravel Co. (Landau Associates 2000b).

A review of the methods used to obtain, process, and analyze the samples found that, with minor variations, internal QA/QC procedures (i.e., sample collection and processing; species sorting, identification, and enumeration; verification) were followed and that the data were suitable for the objectives of each study. Data from all three surveys (the only benthic data available in the LWR) were assigned Category 1 (see Appendix F, Table 6). However, a comparison of major benthic ecological indices among the three surveys is not possible because of differences in sampling gear, surface areas sampled, splitting methods, and sieve sizes.

4.2 CHEMICAL DISTRIBUTIONS IN SEDIMENT

The purpose of this section is to summarize sediment chemical concentrations in the LWR. Data presented here have been used in the Work Plan to assess data gaps. Depending on sediment stability, these concentrations may or may not be representative of current conditions or representative of sources that originated in the ISA. Historic data will be evaluated based on a weight-of-evidence approach as part of a data suitability analysis following the completion of Round 2 sampling. In this section, data from early investigations performed by the USGS and the Corps are summarized first (Section 4.2.1). Section 4.2.2 contains a discussion of the majority of compiled sediment chemical data from facility investigations that began after 1990.

4.2.1 Early Willamette River Sediment Quality Studies

This section summarizes sediment chemistry data collected prior to 1990. Some of the earliest publications with sediment chemistry data were USGS and Corps reports, primarily associated with dredged material characterizations. These early data sets were designated Category 2 primarily due to the lack of QA/QC documentation. Pre-1990 data are not mapped due to their age but are narratively described here.

Rickert et al. (1977) indicated that the sediment data collected prior to their study, which was performed in 1973, were “sparse” and that he and his colleagues were unable to assess the overall quality of sediment in the Willamette River given the lack of analytical data. Consequently, the purpose of their 1973 study was to provide baseline sediment metal concentrations for future comparisons.

Sediment was collected from 31 locations in the Willamette main stem, with 19 of the 31 samples collected from the LWR. The study limited the chemical analysis of sediments to trace metals, citing the lack of toxic organics listed in industrial discharge permits at the time. Aliquots of the sediment samples were separated to obtain fractions of fine silt and clay [i.e., <20 micrometers (µm)] that would be representative of local soils and worldwide averages of claystones and shales. In the LWR, arsenic ranged in concentration from 10 to 20 mg/kg (mean = 13); cadmium ranged from 0.5 to 2.5 mg/kg (mean = 1.2); chromium ranged from 50 to 80 mg/kg (mean = 57); copper ranged from 35 to 70 mg/kg (mean = 45); lead ranged from 25 to 90 mg/kg (mean = 43); mercury ranged from 0.03 to 0.34 mg/kg (mean = 0.14); silver ranged from 0.5 to 1.0 mg/kg (mean = 0.6); and zinc ranged from 260 to 1,295 mg/kg (mean = 419). All measurements were reported in dry weight.

In February 1977, the USGS and the Corps, Portland District, collected two surface sediment samples (top 8 inches) from a nearshore area slated for dredging at RM 9.2 (western shore) (McKenzie 1977). Samples were analyzed for grain size, conventional parameters (i.e., ammonia, total organic carbon, phosphorus, etc.), trace metals, phenol, PCBs, and several pesticides, including DDT and its breakdown products. Both samples were sandy silts with a mean value of 59% fines (silt plus clay). Trace metal concentrations were detected below the mean metal concentrations reported by Rickert et al. (1977). Among organics, PCBs, dichloro-diphenyl-dichloroethane (DDD), dichloro-diphenyl-dichloroethene (DDE), DDT, aldrin, dieldrin, chlordane, diazinon, lindane, and methoxychlor were detected. Total DDTs ranged in concentration from 11 to 15.6 µg/kg, dry weight (mean = 13.3), and PCBs ranged in concentration from 51 to 57 µg/kg, dry weight (mean = 54). The remaining detected pesticides and herbicides were detected at concentrations ranging from 1.0 to 10 µg/kg, dry weight.

As a follow-on to the February 1977 work, the USGS conducted an elutriate study on sediment samples collected from the same approximate location at RM 9.2 (Rinella and McKenzie 1977). Characterized sediments were slated for dredging. Two composite surface sediment samples were collected in May 1977 and prepared for

both bulk sediment chemical analysis and elutriate-test filtrate testing. The elutriates were prepared by mixing dredged sediments collected from RM 9.2 with Willamette River and Columbia River water samples. The mixture was allowed to settle, and the supernatant was then decanted, centrifuged, and filtered. Both the bulk sediment samples and filtrates were tested for ammonia, trace metals, aldrin, chlordane, DDD, DDE, DDT, and dieldrin. The sediment sample contained approximately 60% silt and 12% clay. Arsenic, chromium, copper, lead, and zinc were detected at low levels in both samples. No sediment metal concentrations were detected above the average metal concentrations reported by Rickert et al. (1977). No pesticides or PCBs were detected in the elutriate test samples; however, PCBs, chlordane, DDD, DDE, DDT, and dieldrin were detected in the bulk sediment sample. Chlordane was detected at 15 µg/kg, total DDTs were detected at 26 µg/kg, dieldrin was detected at 0.5 µg/kg, and total PCBs were detected at 130 µg/kg.

In 1987, the Corps tabulated sediment chemical data from four surveys performed in the early 1980s by the Port of Portland, the Corps, EPA, and CH2M Hill (USACE 1987). These data were also summarized in Fuhrer (1989). Samples were collected from RMs 1 to 11.3, mostly from nearshore stations including slips and berths. Data for total organic carbon (TOC), grain-size distribution, several pesticides, and total PCBs were reported in the Corps' 1987 report. Concentrations of dieldrin, endosulfan, endrin, heptachlor, lindane, methoxychlor, perthane, and toxaphene were either not detected or detected at low levels (0.1–5 µg/kg; maximum at RM 9.2). Detected concentrations of some or all of these chemicals were measured in samples collected from RMs 4.3, 4.5, 8.7, 9.2, 9.8, 10.1, 10.7, and 11.2. Detected concentrations of chlordane ranged from 2 to 7 µg/kg (maximum at RM 10.7) and were found at RMs 4.3, 4.5, 8.7, 9.2, 9.8, 10.1, 10.7, and 11.2. Concentrations of aldrin ranged from 2 to 7 µg/kg and were measured in sediments from RM 9.2. Total DDTs ranged in concentration from 1.6 to 3,413 µg/kg (maximum at RM 7.1) and were measured in sediments from RMs 1.2, 4.3, 4.5, 6.8, 7.1, 8.7, 9.2, 9.8, 10.1, 10.7, and 11.2. Total PCBs were detected in all samples but two and ranged in concentration from 14 to 550 µg/kg (maximum at RM 9.7, Berth 201).

In 1983, the USGS and Corps collected sediment and water samples from 10 locations in the navigation channel to determine concentrations of trace metals and organic compounds in elutriate-test filtrate and bulk sediment (Fuhrer et al. 1989). Samples were collected using both a ponar surface grab (top 10 cm) and a gravity core sampler (up to 1 meter), depending on the sample location. Samples were collected at RMs 4.3 and 4.5, mid-channel near Swan Island (RMs 8.3, 8.7, 9.2, 9.6), at RM 9.8, mid-channel at RM 10.1, and at RMs 10.7 and 11.3. Bulk metals concentrations were detected below mean metal concentrations reported by Rickert et al. (1977). Among organics, chlordane, DDD, and total PCBs were detected in all samples. Other organics, such as DDE, DDT, dieldrin, heptachlor, bis(2-ethylhexyl)phthalate (BEHP), and PAHs, were detected in specific samples. Total DDTs ranged in concentration from 1.6 to 19.2 µg/kg (maximum at RM 4.3), and total PCBs ranged in concentration from 14 to 170 µg/kg (maximum at RM 10.1).

Chlordane ranged in concentration from 1 to 10 µg/kg (maximum at RM 10.1). Bis(2-ethylhexyl)phthalate was detected in seven of 10 samples, ranging from 40 to 120 µg/kg (maximum at RM 9.8). The maximum total PAH concentration (3,190 µg/kg) was measured in sediment from RM 11.3.

In 1989, Fuhrer (1989) compiled and evaluated sediment chemical data collected between 1977 and 1983 in Portland Harbor, including the data reported above. Fuhrer (1989) concluded that the navigation channel sediments appeared to have lower chemical concentrations than sediments located in nearshore areas. That trend is supported by the data compiled for this Work Plan as well (see next section).

4.2.2 Sediment Chemistry Data Compiled by LWG

Available Category 1 and 2 historical sediment chemical data collected from 1990 to the present are summarized and mapped in this section. Category 1 and 2 designations by data set are presented in Table 4-1 and Appendix F, Attachment F1. As noted in Appendix F, sample density is the highest at facilities undergoing remedial investigations and dredged material characterizations. Maps 4-1 and 4-2 indicate the years samples were collected for surface and subsurface sediments, respectively. The majority of samples were collected either by EPA in 1997 during its Site Inspection (Weston 1998) or since 1990 by facility operators located between RM 4 and RM 9. In sediment investigations since 1990, chemical concentrations are most commonly reported for bulk sediment (i.e., the concentration in a sample of sediment). For some analytes, sediment porewater (i.e., water centrifuged from a sediment sample) is the preferred media. Data evaluations presented in this section are based on the data available. It's important to note that a consistent suite of chemical constituents was not measured at each historical sediment sampling location.

Table 4-2 summarizes the sediment investigations performed in the LWR since 1990. Data from these investigations are currently available in the LWG's database. Detailed descriptions of these historical sediment investigations are provided in Appendix F. This section provides a general description of sediment chemical concentrations measured in LWR sediments and porewater.

Chemical results for sediments that have subsequently been dredged are included in the LWG's existing chemistry database and flagged as such. While dredged material sediment chemistry results do not provide an assessment of current conditions, the data provide information about potential historical sources and temporal changes. Dredged sediments received both Category 1 and 2 designations based solely on the assessment of laboratory QA/QC results as applied to all the data sets in the database. In this section, statistical summaries of the sediment chemistry exclude dredged sediment results to represent recent conditions. However, in maps the samples that have been dredged are marked and results are shown. In both the tables and maps, only data from 1990 to the present are summarized or mapped. Summary statistics

for surface sediment samples collected in the LWR are presented in Table 4-3 (historical Category 1 and Category 2 data from 1990 to present, excluding dredged sediments). Summary statistics for all subsurface sediment samples in the LWR are presented in Table 4-4 (historical Category 1 and Category 2 data from 1990 to present, excluding dredged sediments). Surface samples are those that were exposed to the overlying water column to a maximum depth of 30 cm at the time of collection. Chemicals are sorted in order of descending detection frequency in the tables to identify which chemicals may have a relatively broad distribution in Portland Harbor.

With few exceptions, the same chemicals were detected at a frequency of 10% or greater in both surface and subsurface sediments, including metals, PAHs, diesel fuel, phthalates, total DDTs, total PCBs, butyltins, dioxins and furans, 4-methylphenol, dibenzofuran, xylenes, and acetone. Some noteworthy exceptions include the following. In the compiled surface sediment data, 2,4-D, 2,4-DB, chlorobenzene, di-n-octyl phthalate, heavy oil, and lube oil were detected in more than 10% of historical surface sediments (due to higher concentrations), but not in more than 10% of the historical subsurface samples. In subsurface samples, ethylbenzene, m,p-xylene, o-xylene, methylene chloride, methylethyl ketone, benzoic acid, 3- and 4-methylphenol (coelution), and alpha- and gamma-hexachlorocyclohexane were detected in more than 10% of the subsurface sediments, but not in more than 10% of the surface sediment samples. Tetrabutyltin and butyltin (as ion) were also detected in more than 10% of the subsurface porewater samples, but not in more than 10% of the surface porewater samples. It's important to note that the number of samples used to calculate frequency for each analyte group varies from 1 to 656 (surface) and from 1 to 390 (subsurface).

Detected concentrations of arsenic, cadmium, copper, lead, mercury, zinc, TBT (bulk measurements and in porewater), bis(2-ethylhexyl)phthalate, total high molecular weight PAH (HPAH), total low molecular weight PAH (LPAH), total PCBs, 2,3,7,8-tetrachlorodibenzo-*p*-dioxin (TCDD), total DDTs, dibenzofuran, 4-methylphenol, and xylene are mapped in Maps 4-3 through 4-38 to show the distributions of these frequently detected chemicals in the LWR. These chemicals were selected because they were detected in greater than 10% of the surface and subsurface samples in more than 10 analyzed samples, and they best represented major chemical groups (i.e., metals, pesticides/PCBs, SVOCs/PAHs, VOCs, butyltins, dioxins/furans).

Chemical distribution maps show data compiled to RM 16 because few data exist beyond this point. The chemical concentration ranges plotted on the maps vary between chemicals, and were determined by plotting frequency distribution curves (Category 1 and 2 detected concentrations) and selecting up to seven intervals that would represent the greatest number of samples for each chemical. Therefore, the maps summarize the relative concentration gradients for each target analyte for all existing surface and subsurface sediment data (detected values only). Sample locations of non-detected chemical concentrations are also shown. The same chemicals are mapped for subsurface sediment using the same concentration interval

as those used for surface sediments. The maximum concentration measured in subsurface samples from each core location is shown. The distributions of metals (including organotins) and organic chemicals are discussed separately below. The discussion of chemistry data below is restricted to the location of *maximum* concentrations (i.e., red-colored symbols). A comprehensive discussion of chemical distributions in sediment within the LWR will be provided in the updated CSM. The selected chemical distribution maps presented in Maps 4-3 to 4-38 indicate that the highest detected chemical concentrations across a range of metals and organic compounds are not widespread in the LWR and are generally restricted to specific off-channel areas.

Metals and Tributyltin

The bulk sediment distributions of arsenic, cadmium, copper, lead, mercury, zinc, and TBT (bulk and in porewater) are plotted in Maps 4-3 through 4-20 (surface) and Maps 4-21 through 4-38 (subsurface). Overall, high metal and TBT concentrations are not widespread in the ISA and generally appear to be associated with specific facilities and operations occurring in physically sheltered areas off the main river channel. Relative to other concentrations detected in the ISA, maximum concentrations of arsenic were measured off MarCom (surface), U.S. Moorings (surface), Triangle Park (subsurface), Portland Shipyard (surface and subsurface), and in Swan Island Lagoon (surface). Maximum cadmium concentrations were measured in Terminal 4 (Slips 1 and 3, surface and subsurface), Willbridge Bulk Fuel Terminal (surface), Swan Island Lagoon (surface), and on the riverside of the Equilon dock. Maximum copper concentrations were measured in surface Marcom sediments, the Portland Shipyard (surface and subsurface), and in Swan Island Lagoon surface sediments. Maximum lead concentrations were measured off several facilities, including Oregon Steel Mills (surface), Terminal 4 Slip 1 (surface) and Slip 3 (surface and subsurface), MarCom (surface and subsurface), Hendron Tow Boat (surface), U.S. Moorings (subsurface), ATOFINA (surface), Portland Shipyard (surface and subsurface), Swan Island Lagoon (surface), between the City of Portland Outfall 18 and the inside of the Equilon dock, and the riverside of the Equilon dock. Maximum mercury concentrations were measured in surface and subsurface Portland Shipyard sediments. Maximum zinc concentrations occur in Terminal 4, Slip 3 surface and subsurface sediments, MarCom (surface), U.S. Moorings (surface), Portland Shipyard (surface and subsurface), Swan Island Lagoon (surface), and in the vicinity of Terminal 1 and Outfall 16 (surface and subsurface). The Portland Shipyard and the mouth of the adjoining Swan Island Lagoon have the highest porewater TBT levels in surface sediments. In addition to those facilities with porewater TBT, facilities with the highest bulk TBT in sediments included Schnitzer Steel's International Slip (surface) and Triangle Park (subsurface).

In general, sediments in the main river channel do not show maximum metals concentrations relative to nearshore areas. Exceptions include navigation channel sediments at RM 7.7 (surface copper, subsurface bulk TBT) and RM 6.5 (surface TBT porewater).

Organic Compounds

The distributions of bis(2-ethylhexyl)phthalate, total HPAH, total LPAH, total PCBs, 2,3,7,8-TCDD, total DDTs, dibenzofuran, 4-methylphenol, diesel fuels, and xylene in sediments (detected concentrations only) are plotted in Maps 4-3 through 4-20 (surface) and Maps 4-21 through 4-38 (subsurface). As with the metals, relatively high levels of organic chemicals are generally restricted to nearshore facilities in the ISA. For example, the highest concentrations of total HPAH and/or LPAH have been measured in the vicinity of bulk fuel facilities (ARCO – surface and subsurface, Mobil Oil - surface, Kinder-Morgan Liquid Terminal – subsurface), PGE Harborton (subsurface), Linnton Plywood Association (subsurface), Transloader (subsurface), Hendron Tow Boat/Marine Finance (surface and subsurface), U.S. Moorings (surface and subsurface), Gasco facility (surface and subsurface extending into the channel), Wacker Siltronics (surface and subsurface), the McCormick & Baxter site (surface and subsurface) and Willamette Cove (surface and subsurface), the dock at ATOFINA (surface and subsurface), Goldendale Alumina (surface), offshore at UPRR, and at the Port of Portland's Terminal 4 (surface and subsurface). Similarly, the highest concentrations of total DDTs have been measured just offshore of the ATOFINA Chemicals facility.

Maximum PCBs concentrations have been observed in the vicinity of Oregon Steel Mills (surface), Wacker Siltronics (surface), around the Portland Shipyard and in Swan Island Lagoon (surface and subsurface), between the City's Outfall 18 and inside the Equilon dock, (surface), in the vicinity of Terminal 1 and the City's Outfall 16 (surface and subsurface), off Goldendale and UPRR (surface), and Glacier Northwest (subsurface). Maximum concentrations of dioxins and furans were detected off McCormick & Baxter (surface). Maximum concentrations of bis(2-ethylhexyl)phthalate have been measured in Swan Island Lagoon (surface); at the adjacent Portland Shipyard (surface); at the Equilon facility (riverside - subsurface); at ATOFINA (subsurface); at Terminal 4, Slip 1 (surface); at the McCormick & Baxter site (surface); and in the vicinity of Terminal 1, both offshore and near the City's Outfall 16 (surface). Maximum dibenzofuran concentrations have been measured in sediments adjacent to the McCormick & Baxter site (surface), Willamette Cove (subsurface), Oregon Steel Mills (surface), Terminal 4 Slip 3 (surface), Mobil Oil (subsurface), Transloader (subsurface), Hendron Tow Boat (subsurface), Gasco (surface), Wacker Siltronics (surface and subsurface), U.S. Moorings (subsurface), and offshore of UPRR (surface). Maximum concentrations of 4-methylphenol were measured in sediments at Willbridge Fuel Terminals (surface), in Swan Island Lagoon (surface), and off the Gunderson facility (surface). Maximum concentrations of xylene have been detected at the Portland Shipyard (surface) and at Gasco (surface and subsurface). Maximum concentrations of diesel fuels occurred at Terminal 4 Slip 3. Like the metals, some organics are present in channel sediments, including dibenzofuran and PAHs at RM 6.3.

Trends in Chemical Concentrations by River Mile

Summary statistics for surface sediments and subsurface sediments, organized by river mile, are shown in Tables 4-5 and 4-6, respectively (historical Category 1 and Category 2 data since 1990, dredged sediment concentrations removed). Among analyte groups in the historical surface and subsurface data, PAHs were detected most frequently and were detected in greater than 10% of the samples collected in the LWR. Between RM 2 and RM 11, metals, PAHs, phthalates, total DDTs, total PCBs, dibenzofuran, 4-methylphenol, diesel fuels, and butyltins were detected in greater than 10% of the samples. However, some chemicals were unique to particular river mile segments in part because of the sample locations where these chemicals were analyzed. These chemicals are shown by river mile in Figure 4-1.

Average chemical concentrations for arsenic, cadmium, copper, lead, mercury, zinc, TBT (bulk measurements), bis(2-ethylhexyl)phthalate, total HPAH, total LPAH, total PCBs, total DDTs, 4-methylphenol, dibenzofuran, diesel fuel, xylenes, 2,3,7,8-TCDD, total organic carbon and percent fines (clay+silt) are shown graphically by river mile in Figure 4-2. Both surface and subsurface average sediment chemical concentrations are compared on each graph. It should be noted that the patterns that emerge from this display may result from the fact that there are more surface than subsurface samples. Some general observations are presented here for purposes of preliminary screening. Average subsurface chemical concentrations of mercury, bulk TBT, total DDTs, and diesel fuel are generally higher than corresponding average surface concentrations. This pattern is also true for total PCBs between RM 4 and RM 9. In contrast, average surface concentrations of bis(2-ethylhexyl)phthalate and 4-methylphenol are generally higher than corresponding average subsurface concentrations. The same is true for total HPAHs between RM 6 and RM 11; copper between RM 1 and RM 3, RM 4 and RM 7, and RM 8 and RM 11; and arsenic between RM 2 and RM 4, RM 5 and RM 7, and RM 8 and RM 11. For the few historical xylene and 2,3,7,8-TCDD measurements, average surface concentrations were greater than corresponding subsurface measurements. In addition, average surface and subsurface concentrations of TBT, total DDTs, total PCBs, total HPAHs, total LPAHs, and copper do not greatly differ from one another.

Patterns also emerge relative to river miles. In general, average surface chemical concentrations were generally higher than corresponding average subsurface concentrations between RM 2 and RM 3 and between RM 9 and RM 10. The opposite (greater subsurface than surface average concentrations) was true between RM 0 and RM 1 and between RM 3 and RM 4. Peaks in average concentrations also occur at certain river miles. Average surface concentrations of dibenzofuran (RM 7 to 8), zinc (RM 9 to 10), cadmium and lead (RM 2 to 3), and arsenic (RM 2 to 4, RM 5 to 6) peak well above corresponding average subsurface concentrations. For mercury, average subsurface concentrations peak well above average surface concentrations between RM 3 and RM 4. Peaks in metal concentrations generally occur between RM 2 and RM 6 and between RM 8 and 9. Peaks in DDT, 2,3,7,8-TCDD, and diesel fuel concentrations occur between RM 7 and RM 8. Xylene

concentrations peak between RM 6 and RM 7. Total PCBs concentrations peak between RM 2 and RM 3 and again between RM 9 and RM 10. With the exception of bis(2-ethylhexyl)phthalate and 4-methylphenol, maximum chemical concentrations generally occur between RM 2 and RM 9, bracketing Portland's industrial area. The broad, bell-shaped curves of average total HPAH and total LPAH concentrations between RM 2 and RM 9 support this observation.

4.3 WATER QUALITY STUDIES

Water quality in the LWR reflects the diverse land uses and large size of the watershed. Chemicals in discharges and runoff from the variety of agricultural, urban, and forested land uses in the Willamette River basin are combined in the river by the time it reaches Portland. Water quality in the ISA may be additionally affected by point source discharges, surface water runoff, contaminated groundwater, and other sources discharging directly to this reach of the river (see Section 3).

The objective of this section is to review the water quality data most relevant to sediments and aquatic life in the ISA. For purposes of this Work Plan, data collected prior to 1990 are considered historic; data collected since 1990 represent current water quality conditions. For both recent and historic data, conventional parameters, including temperature, pH, dissolved oxygen, and nutrients, have the largest number of measurements. These parameters are the least costly to measure, provide a preliminary indication of water quality conditions, and use analytical methods that have been available for several decades (Fuhrer et al. 1996). However, they are not related to releases of hazardous substances and are therefore not of concern in the context of CERCLA. The chemicals measured frequently in bottom sediments (e.g., trace metals and organic compounds) have not been measured frequently in the water column, primarily due to the high cost of analysis.

This section reviews studies and summarizes data indicative of water quality in the river. Both general water quality (as indicated by routine monitoring conducted by government agencies) and site-specific water quality data are described. This section does not include water quality data collected as part of permitted discharge monitoring or stormwater data (see Section 3 for information on these sources and monitoring requirements).

4.3.1 Historical Water Quality

Conventional Parameters

Prior to 1990, dissolved oxygen (DO) was the conventional parameter of greatest concern in the Willamette River (Fuhrer et al. 1996; Rickert et al. 1977). Most aquatic organisms require adequate DO concentrations to survive, and anadromous cold-water fish are particularly sensitive to DO levels. Late summer, when river flow is lowest and air temperature highest, is historically the most critical period for DO

levels in the LWR. Gleeson (1972) summarized DO data collected from 1929 to 1971. During the summer low-flow periods in the 1940s and 50s, the DO concentrations in Portland Harbor were below the state standard of 5 mg/L. A dramatic increase in DO was evident by the mid-1970s due to upgrading of wastewater discharges to secondary treatment and the release of additional water from the dams during the summer (Fuhrer et al. 1996).

The average temperature in the Willamette River has not changed significantly over time, particularly when compared to the seasonal changes and annual maximum and minimum temperatures (Gleeson 1972). Gleeson reviewed temperature data for 13 of the 41 years from 1929 through 1970. In all years reviewed, at least one station in the river had temperatures greater than 21°C. As expected, peak temperatures in Portland Harbor corresponded to low water flow and highest air temperatures in July through September. Fuhrer et al. (1996) summarized monthly distributions of daily mean water temperatures in the Willamette River at Portland between 1976 and 1981. Minimum temperatures were consistently observed in January (0.1 - 9.0°C), and maximum temperatures occurred in July and August (18 - 25.7°C).

Bacterial concentrations have also been of concern. Methods for measuring and reporting bacterial concentrations have changed over time, and data are not directly comparable. However, Gleeson (1972) described historical trends in bacteria concentrations in the Willamette River. In general, bacterial concentrations during the 1920s and 1930s were elevated in the vicinity of municipalities and were roughly proportional to population, as all cities were discharging raw sewage to the river. By the 1940s, bacterial distribution patterns were the same but concentrations were increased, reflecting increased population. In the 1960s, bacterial concentrations were reported to be 5 to 100 times the limit considered safe for swimming. By the 1970s, bacterial concentrations began to decrease, reflecting improved sewage treatment. From 1962 to 1970, the average summer fecal coliform count dropped by a factor of 10 to 100 (Gleeson 1972).

Chemical Parameters

Tetra Tech et al. (1993) reviewed historical data on chemicals in the water column of the Willamette River and its major tributaries. Tetra Tech found that there are very little water column chemical data prior to 1990. DEQ routinely monitors major metals (e.g., aluminum, iron, manganese) but not chemicals that may be associated with the release of hazardous chemicals. Only one report in DEQ's database contained chemical data collected prior to 1990. Water samples were collected at DEQ Station #402000 (Map 4-39) on August 30 and September 1, 1982, and were analyzed for over 100 volatile and semivolatile organics as well as PCBs and pesticides. Only four compounds were detected at levels that could be quantified: bis(2-ethylhexyl) phthalate, di-n-butyl-phthalate, di-n-octyl phthalate, and trichloroethylene.

4.3.2 Current General Water Quality

General (i.e., not associated with a specific facility) water quality data collected since 1990 in the LWR are summarized in this section. The main sources of data were DEQ and USGS monitoring programs. These data were collected as part of several programs, including DEQ's ambient monitoring program, USGS's National Water Quality Assessment program, and the Willamette River Basin Water Quality Study cooperative program between USGS and DEQ. These data were obtained through the EPA STORET and DEQ's LASAR database.

Nearly all data were collected at four DEQ or USGS monitoring stations in the LWR main stem (Table 4-7; Map 4-39). These stations had the greatest amount of data, most frequent sampling (including all months and flow conditions), and were determined overall to be most representative of general water quality in the lower river. Although there were data for other stations, they were sampled only on a single occasion or were representative of source characteristics rather than water quality in the river. Water quality data from the four DEQ and USGS stations most representative of general water quality in the river were obtained from the STORET and LASAR databases. These data are summarized in Table 4-8a-c. The most complete data are for conventional parameters. The ambient monitoring programs established by DEQ in the Willamette River also routinely monitor for metals, but not for organic pollutants. Recent organic data in the LWR main channel are limited to herbicide and pesticide analyses reported by USGS.

Conventional Parameters

Selected conventional water quality measurements since 1990 that are most relevant to sediment and aquatic life criteria and indicative of general water quality are summarized in Table 4-8a.⁷ Temperature remains the water quality parameter of greatest concern in the LWR and is one of the reasons the LWR appears on the State of Oregon's 303(d) list under the Clean Water Act (DEQ 1998). Temperature measurements exceeding 20°C have been reported in the late summer each year by DEQ. The State of Oregon currently plans to develop a TMDL for temperature in the LWR by 2003 (DEQ 2001a).

DEQ (2000d) reported that water quality in the main stem of the LWR remains poor, but showed significant improvement from 1990 to 1999 based on the Oregon Water Quality Index, a general water quality score incorporating 10 conventional water quality variables. Fecal coliform, elevated nutrients, and biological oxygen demand were cited as contributing factors to the low Oregon Water Quality Index score. DEQ is also developing TMDLs for bacteria, algae, and DO upstream of the LWR because of these persistent problems (DEQ 2001b).

⁷ Types of measurements monitored but not included in Table 4-7 include color, conductivity, alkalinity, oxygen demand, and nutrients.

Inorganic Parameters

Although water column data for major metals are available for a limited number of locations, there are fewer trace metal measurements. In general, routine monitoring samples collected by DEQ are analyzed for major metals, including aluminum, iron, and manganese. A few samples collected by DEQ were analyzed for trace metals. However, a greater number of water samples collected by USGS from 1990 to 1999 (Station #14211720, LWR at Portland) were analyzed for over a dozen different dissolved trace metals. These data are also summarized in Table 4-8b. Detectable concentrations of copper, lead, nickel, selenium, and zinc were reported.

Recent studies have prompted the Oregon Department of Health Services (ODHS) to issue an advisory concerning elevated mercury concentrations in several fish species in the LWR. An ODHS (2001) news release states "Mercury in the fish is believed to come from natural volcanic and mineral sources in the headwaters of the river and possibly from a number of human-made sources along the river." Based on samples collected from 1969 through 1997, average mercury concentrations in smallmouth and largemouth bass and northern pikeminnow were 0.63 ppm. EPA's mercury criterion for human health is 0.30 ppm (ODHS 2001). This advisory has resulted in another listing for the LWR on the State's 303(d) list (DEQ 1998). The listing requires the DEQ to determine a TMDL for mercury in the LWR by 2003 (DEQ 2001b).

Organic Parameters

Recent data on water column concentrations of organic pollutants are also limited. No water column data for semivolatile or volatile organics collected during the past decade in the main channel of the LWR were found in the EPA or DEQ databases.

USGS analyzed water samples from the LWR at Portland (Station # 014211720) for approximately 100 organic compounds consisting almost entirely of herbicides and pesticides. Samples were collected between 1993 and 1998, and the results are summarized in Table 4-8c. Thirty compounds were detected. Atrazine, metolachlor, simazine, and deethyl atrazine were the most frequently detected pesticides. Of the pesticides and herbicides included as chemicals of interest in sediments in the LWR (SEA et al. 2002a), only dieldrin (total), DDE, and DDT were detected in water samples. Total PCBs were undetected in nine water samples collected by the USGS between 1994 and 1997.

EPA completed a TMDL assessment and allocation for dioxin in the Willamette River as part of a larger program for the Columbia River basin, and approved the dioxin TMDL in 1991. The TMDL develops waste load allocations for the chlorine bleaching pulp mills, including the Pope and Talbot mill located on the Willamette River at RM 148. The TMDL may be revised if other dioxin sources are identified. The target (i.e., loading capacity) dioxin allocation for the Willamette River (measured at Portland) is 0.54 mg/day.

4.3.3 Current Site-Specific Water Quality

Site-specific water quality data collected since 1990 in the LWR are summarized in this section. These data were collected as part of investigations pertaining to specific facilities, and therefore are not considered representative of overall water quality conditions in the ISA.

The Rhone-Poulenc survey (Woodward-Clyde Consultants 1995) analyzed water samples for 205 chemicals consisting of semivolatile and volatile organics, herbicides, pesticides, and dioxins/furans. Detected results included: 11 dioxins/furans, 5 pesticides, and 2 semivolatile organics (Table 4-8d). The McCormick & Baxter survey (PTI 1992) analyzed water samples for 18 PAHs only. Fluoranthene, fluorine, naphthalene, phenanthrene, and pyrene were detected (Table 4-8e).

A recent investigation at the McCormick & Baxter site (Ecology & Environment 2003) analyzed unfiltered and filtered water samples collected by EPA, DEQ, and Oregon State University (OSU) for PCP, metals (i.e., arsenic, chromium, copper, and zinc), and PAHs. Chromium, copper, zinc, and 15 PAHs were detected in the unfiltered samples, while arsenic, copper, fluoranthene, and pyrene were detected in filtered samples (Table 4-8f).

OSU also deployed passive sampling devices at their surface water grab stations at the McCormick & Baxter site. Semipermeable membrane devices (SPMDs) were used to monitor dissolved bioavailable organic constituents (PCP and PAHs), and diffusive gel thinfilms were used to assess labile metals (arsenic, chromium, copper, and zinc (OSU undated). Chromium, copper, acenaphthalene, anthracene, fluoranthene, fluorene, phenanthrene, and pyrene were detected (Table 4-8g).

4.4 ECOLOGICAL STUDIES

This section contains an overview of previous ecological studies conducted in the ISA. Details of these studies and how they will be used in the risk assessment process are provided in the problem formulation section of the Ecological Risk Assessment (ERA) Approach (Appendix B). The following is a description of the relevant sediment toxicity, benthic community, enzyme induction, histopathology, and tissue residue studies. Additional details, including results, maps, and descriptions of habitat types, fish, amphibians, aquatic plants, birds, and mammals, are found in Appendix B.

4.4.1 Sediment Toxicity

Sediment bioassays are laboratory tests in which benthic or epibenthic organisms are exposed to sediments. After a defined exposure period, organism survival or some

other measure of an adverse biological effect is observed. Sediment toxicity tests are one tool to predict whether sediments have an adverse impact on resident species.

In 1998, the Corps, EPA, Washington State Department of Ecology, DEQ, and Washington State Department of Natural Resources prepared the Dredged Material Evaluation Framework for the Lower Columbia River Management Area (LCRMA) (USACE et al. 1998) to provide guidelines for dredged material sampling and testing. Since completion of the draft, dredging proponents with projects in the LWR have generally performed, when required, two tests to assess the suitability of dredged material for disposal at a freshwater site. These tests include the amphipod (*Hyalella azteca*) 10-day survival test and the midge (*Chironomus tentans*) 10-day survival and growth test.

In studies completed prior to the draft LCRMA guidelines, acute bioassays were performed using *H. azteca*, *Chironomus riparius*, *Daphnia magna* (water flea), and rainbow trout. These older studies also included elutriate testing of *D. magna* and trout. An elutriate test considers the effects of dissolved chemicals and chemicals associated with suspended particulates (after mixing has occurred) on water column organisms. A few studies used the Microtox test, which measures a decrease in bacterial luminescence caused by the presence of chemicals in sediments. Microtox tests are generally not currently used in regulatory programs.

All bioassay data were validated using “QA1” bioassay data validation guidelines (PTI 1989). QA1 is a term used by regulators in the Dredged Material Management Program (the umbrella regulatory agencies overseeing LCRMA) that allows an abbreviated level of review while providing confidence that the data have been adequately checked and approved for regulatory decision making. The QA1 level of review checks completeness, holding conditions, standard reporting methods, and QA/QC results for negative control, reference sediment, positive control (reference toxicant), and measured water quality parameters according to standard testing methods. Information provided in a standard laboratory report is generally adequate for performing a QA1 review.

For this data compilation, if the QA1 review led to questions concerning data quality, the data were categorized as Category 2 (unknown or of suspect quality). Otherwise, the data were placed in Category 1 (of known and acceptable quality). Category 2 data are those generally lacking supporting information to perform a QA1 level of review. One survey had two samples that were analyzed outside of recommended holding times, and those samples received Category 2 classification. Category 1 and Category 2 data designations are provided for each study listed in Table 4-9.

Table 4-10 lists existing bioassay studies for the LWR. Sample collection locations are shown in Map4-40. Bioassay results, including maps, specific to the ISA are listed in Appendix B, Section 3.5.

4.4.2 Benthic Community Structure

Benthic macroinvertebrates utilize various habitat types within a large river ecosystem. These habitats can generally be divided into soft and hard substrates, with soft substrates supporting an infaunal community and hard substrates an epibenthic community. These habitats are typically quite different in community structure and function.

The structure and function of macroinvertebrate communities within the Willamette River basin have been extensively investigated. However, few studies have focused on the LWR. Tetra Tech and Taxon Aquatic Monitoring Co. (1994) reported on the benthic macroinvertebrate community structure at six stations as part of the Willamette River Basin Water Quality Study. Dames & Moore (1998) sampled 16 stations in the Portland Harbor area, and Landau Associates (2000b) collected samples at 10 locations near Ross and Hardtack islands. Hjort et al. (1984) and Ward et al. (1988) conducted other limited investigations. In the summer and fall of 2002, the LWG conducted surveys of the epibenthic and infaunal macroinvertebrate communities found in the ISA as part of the Round 1 assessment of Portland Harbor. Detailed information about benthic communities in these and previous studies in the LWR is found in Appendix B.

4.4.3 Fish Community

Ellis Ecological Services (2000) reviewed the published and unpublished literature relating to the fish community in the LWR. Results from this review and more current research on fish use of the LWR are presented in Appendix B.

4.4.4 Wildlife and Aquatic Plants

Some literature exists that documents bird, mammal, amphibian, and aquatic plant species expected to occur in and around the LWR (Puchy and Marshall 1993; Csuti et al. 1997; Adolfson et al. 2000). In the summer of 2002, the LWG conducted a plant and amphibian survey of the LWR as part of the Round 1 assessment of Portland Harbor. Results from this survey and summaries of the above literature are presented in Appendix B.

4.4.5 Enzyme Induction Studies

Several enzyme induction studies of hepatic cytochrome P450-1A1 have been conducted in fish collected within the ISA and great blue heron embryos collected outside the ISA. These studies are summarized below. Cytochrome P450 enzymes are important in detoxifying exogenous compounds in most fish, birds, and mammals. Induction of cytochrome P450-1A1, which catalyzes ethoxyresorufin O-deethylase (EROD) and aryl hydrocarbon (benzo[a]pyrene) hydrolase activity, has been correlated with toxic potency of contaminants. Per the AOC/SOW, the risk

assessment will only consider effect endpoints associated with growth, reproduction, and mortality. The following studies have been evaluated per requirements of the AOC/SOW. In the ecological risk assessment, these studies will be evaluated to determine if any of the enzyme induction endpoints are appropriate for inclusion in the effects assessment.

Curtis et al. (1993) investigated the sensitivity of cytochrome P450-1A1 induction in fish as a biomarker for distribution of 2,3,7,8-TCDD and 2,3,7,8-tetrachlorodibenzofuran (TCDF) in the Willamette River. This study examined the relationships between TCDD or TCDF and induction of microsomal EROD and total cytochrome P450-1A1 content in muscle tissue from the common carp and the northern pikeminnow. Thomas and Anthony (1997) used both EROD and the H4IIE assays to detect induction of cytochrome P450-dependent enzymes in great blue heron embryos exposed to 2,3,7,8-TCDD and structurally similar compounds at Ross Island (a site upstream of the ISA). The EROD assay determined the impact of chemicals in the egg on a developing embryo, and the H4IIE assay determined the potency of the egg contents to induce enzymatic activity in rat hepatoma cells.

4.4.6 Histopathology

This section summarizes available data in the LWR related to animal histology or histopathology. Histopathology refers to microscopic changes in diseased animal tissues as a result of exposure to chemicals. In the ERA, these studies will be evaluated to determine if any of the histopathological endpoints are appropriate for inclusion in the effects assessment.

Fish Histopathology

DEQ (1994) and Tetra Tech (1993) collected northern pikeminnow and largescale suckers from various sites along the Willamette River. In the Portland Harbor, samples were collected at RM 1 and within the ISA at RM 6.5 (Tetra Tech 1993) and at RM 7 (DEQ 1994). Both studies qualitatively evaluated external and internal features and measured blood parameters using assessment methodology developed for salmonids.

Curtis et al. (1993) conducted a microscopic examination of common carp, cutthroat trout, and northern pikeminnow liver, gills, kidneys, spleen, stomach, and gonads. One station was sampled in the ISA at RM 7.

As part of the McCormick & Baxter RI (PTI 1992), Pastorok et al. (1994) examined 249 largescale sucker livers, including those collected from two stations near RM 7 and one station near RM 6.

Two studies have addressed skeletal deformities in fish collected in the LWR. From 1992 to 1994, Tetra Tech (1993, 1995) examined skeletal abnormalities in juvenile northern pikeminnow collected at RM 3. The incidence of skeletal abnormalities at

RM 3 was consistently low and within a range of 2 to 5% reported for unstressed natural fish populations and laboratory stocks (Tetra Tech 1995). In 1998, EVS Environmental Consultants (2000) determined the incidence of skeletal abnormalities to be 19.7% in 71 chiselmouth collected upstream of the ISA at RM 15.

Avian and Mammalian Histopathology

In general, very few studies have been conducted that address histopathological changes in birds and mammals occurring in the LWR area. One study examined a great blue heron rookery in the LWR upstream of the ISA. Thomas and Anthony (1997) compared eggshell thinning at the Ross Island heronry with that at Fisher and Bachelor islands in the lower Columbia River. Henny et al. (1996) conducted a study in the Portland-Vancouver area of the Columbia River that examined relationships between reproductive tract disorders in river otters and chemical concentrations measured in river otter livers.

4.4.7 Tissue Residue Studies

Very few studies of chemical residues in fish and benthic invertebrates have been undertaken in the LWR. The following discussion summarizes data compiled from various toxicological studies of chemical residues in fish and benthic invertebrates of the Willamette basin, with particular emphasis on studies or portions of studies that have occurred in the LWR. The tissue residue data will be used to assess risks associated with the consumption of fish and benthic invertebrates by birds and mammals, as well as risks to fish species resulting from their chemical exposure within the ISA. Tissue chemistry results are summarized in Table 4-11. When possible, concentration data were converted to wet weight.

Fish and Benthic Invertebrate Tissue Residue Studies

Tissue residue studies were evaluated for data quality in the same manner as the sediment chemistry data (see Appendix F). Of the seven studies identified, none of the data were considered Category 1 due largely to the lack of supporting analytical QA/QC information. However, these studies are briefly summarized below, as they remain valuable in the initial understanding of tissue residue levels in fish and invertebrates from the LWR and in formulating future work efforts. Tables B-3a and B-3b in Appendix B provide the complete set of fish tissue data collected within the ISA.

PTI (1992) collected largescale sucker and crayfish from five locations near the McCormick & Baxter site (at RM 7). PAHs and metals were detected in both the sucker muscle tissue and the whole-body crayfish tissue.

Black crappie, common carp, and smallmouth bass were collected by *The Oregonian* (2000). Organochlorine pesticides (including DDT), PCBs, and mercury were detected in whole-body tissues collected in the Harborton Forest and wetlands, Terminal 4, and RM 5 to 6.

Mercury was detected in muscle fillets of common carp, largemouth bass, northern pikeminnow, largescale sucker, and smallmouth bass collected by DEQ (2000b). No other chemicals were analyzed in this study.

EPA (1992) analyzed fillet and whole-body tissues of common carp and northern pikeminnow collected in the railroad bridge area (at RM 7). Six carp fillets and six northern pikeminnow whole-body samples were analyzed for dioxins and furans. In addition, three carp fillets and three northern pikeminnow whole-body samples were analyzed for pesticides, PCBs, and DDTs.

Finally, one common carp whole-body tissue sample was collected from RM 9 and analyzed for dioxins and furans by Bonn (1998).

Additional Bioaccumulation Studies

In addition to the data cited above and in Appendix F and Table 4-11, other sources of applicable bioaccumulation data have been identified. In November 1999, the Corps (1999) collected five sediment samples from the LWR at locations within and outside the ISA. Sediment samples were submitted for 28-day bioaccumulation testing to evaluate uptake of 4,4'-DDD, 4,4'-DDE, and 4,4'-DDT in *Lumbriculus variegatus*, a freshwater oligochaete. As shown in Table 4-12, 4,4'-DDD and 4,4'-DDE were detected in the oligochaete.

Thomas and Anthony (1997) measured concentrations of pesticides, PCBs, dioxins, and furans in fish tissue and heron eggs at Ross Island to evaluate chemical biomagnification from prey items of the great blue heron.

4.5 SUMMARY OF HUMAN USES

This section describes the current understanding of the physical and biological setting of the ISA as it pertains to potential human uses, including specialized groups that may use the river for various activities. Most of the demographic information relating to the ISA is based on historical background and documented human uses. This information is used to determine potential receptor populations and to develop the general CSM.

Portland Harbor and the Willamette River have served as a major industrial water corridor for more than a century. Industrial use of the ISA and adjacent areas has been extensive. The majority of the ISA is currently zoned for industrial land use and is designated as an "Industrial Sanctuary" on the Portland Comprehensive Plan Map (City of Portland 2001a). The Portland industrial sanctuary policy is designed to encourage the growth of industrial activities in the city by preserving some industrial land primarily for manufacturing purposes. The Guild's Lake Industrial Sanctuary Plan (GLISP) is intended to preserve and enhance industrial land in the area generally bounded by Vaughn Street on the south, the St. Johns Bridge on the north, Highway 30 on the west, and the Willamette River on the east (City of Portland 2001a). Over

many decades, public and private investments in infrastructure, such as marine, rail and highway facilities as well as investments in industrial physical plants, have made the Guild's Lake Industrial Sanctuary one of the premier heavy industrial districts in the Pacific Northwest. The purpose of the GLISP is to maintain and protect this area as a dedicated place for heavy and general industrial uses. The plan's objectives were adopted as part of Portland's Comprehensive Plan to ensure preservation of this land use over the next 20 years.

Much of the shoreline in the ISA includes steeply sloped banks covered with riprap or constructed bulkheads, with human-made structures such as piers and wharves over the water in various locations. A comprehensive update of Portland's Willamette Greenway Plan and related land use policies and zoning is underway, addressing all of the Willamette riverfront in Portland (City of Portland 2001b). The plan update may affect land use practices (e.g., stormwater management) in Portland Harbor, but it will not affect the "Industrial Sanctuary" designation.

Worker activities that may include contact with sediments and surface water at industrial and commercial facilities in the ISA are limited in the shoreline areas due to the sparse beach areas and high docks associated with most of the facilities.

In addition, the LWR provides many natural areas and recreational opportunities, both within the river itself and along the riverbanks. Within the ISA, Cathedral Park, located under the St. Johns Bridge, includes a sandy beach area and public boat ramp and is used for water skiing, occasional swimming, and waterfront recreation. Recreational beach use also may occur within Willamette Cove, which is a riverfront natural area, and in Swan Island Lagoon. Swan Island Lagoon includes a public boat ramp. Additional LWR recreational beach areas exist on Sauvie Island and in Kelly Point Park, both of which are outside of the ISA. Potential recreational beach use areas in the ISA are shown in Map 4-41a-c.

The St. Johns Town Center is a mixed-use district that extends to the waterfront on the east side of the Willamette River at the St. Johns Bridge. Proposals emerging in the recent St. Johns-Lombard Plan project and neighborhood-generated Linnton Neighborhood Plan include redevelopment for areas near the Willamette River. These areas are potential examples of the "vibrant waterfront districts and neighborhoods" theme in the River Renaissance Vision developed by the City of Portland.

The exact extent to which commercial fishing occurs within the ISA is currently not known. No reports of commercial fisheries for anadromous salmonids on the Willamette River have been found. A limited commercial crayfish fishery exists in the Lower Willamette River. However, non-commercial fishing is conducted throughout the LWR basin and within the ISA, both by boaters and from locations along the banks. A news story by *The Oregonian* and the limited interviews by ATSDR suggest that the groups most likely to be catching and eating fish from the LWR include immigrants from Eastern Europe and Asia, African-Americans, and

Hispanics. These same sources also suggest that the most consumed species are carp, bullhead catfish, crappie and small-mouth bass (ATSDR 2002). Other sources (CRITFC 1994) suggest that Native Americans fish in the Willamette River. The LWR provides a ceremonial and subsistence fishery for Pacific lamprey and spring chinook salmon for Native American Tribes. Many areas in the LWR are also important currently for cultural and spiritual uses by local Native Americans.

Transients have been observed along the LWR, including some locations within the ISA. The observation of tents and makeshift dwellings affirms that transients were living along some riverbank areas. Transients are expected to continue to utilize this area in the future.

4.6 USABILITY OF HISTORICAL DATA

A substantial amount of historical data for the LWR have been compiled and presented in earlier sections of this Work Plan. The usability of these data for the risk assessment and FS needs to be ascertained as the distribution of acceptable historical data will affect the development of RI sampling programs. The principal issues related to the usability of historical data include data quality, sediment stability, and the intended use of the data. All of these factors must be acceptable for data to be considered usable.

The quality of the existing data has been evaluated (Section 4.1 and Appendix F) and data have been categorized as Category 1 (data are of known quality and are considered to be acceptable for use in decision making for the Site) or Category 2 (data are of generally unknown or suspect quality). This evaluation focused on individual analyte groups within each survey when possible, and so any given survey may contain all Category 1 data, all Category 2 data, or a combination of Category 1 and 2 data. Overall, the existing data collected within the ISA that qualify as Category 1 data are principally associated with sediment chemistry and toxicity studies using benthic organisms. Category 1 sediment chemistry data will be evaluated for use in determining the distribution of chemicals in the ISA, understanding sources, and identifying remediation areas. As discussed further in this section, it is believed that much of this data will be usable for these purposes; however, those Category 1 data determined to be critical to human health or ecological risk assessments require an EPA-approved level of data validation, comparable to Washington State Department of Ecology's "QA2" evaluation. Currently, there are less than 10 sediment investigations meeting these criteria, rendering most existing Portland Harbor sediment chemistry data unusable for risk assessment. In addition, almost all other types of historical environmental data collected have been determined to be Category 2 data and therefore may be of limited use in the RI/FS, subsequent to project scoping.

Table 4-13 presents the number of post-1990 Category 1 sediment samples in Portland Harbor by river mile for each analyte class. As the table demonstrates, there are considerable existing Category 1 sediment analysis data available for use in the RI/FS, such as the development of sediment management areas. The number of samples analyzed varied for each analyte class: excluding conventionals, up to 507 surface sediment samples and 337 subsurface sediment samples were each analyzed for a given analyte class. PAHs were the most frequently reported analyte class for both surface and subsurface sediment samples. Herbicides and dioxins and furans were the least frequently reported analyte class for both surface and subsurface sediment samples.

The evaluation of sediment stability will continue to determine whether existing chemical concentrations continue to represent conditions at the locations where sampling occurred. Results of the LWG's STA[®], SPI, and bathymetry studies (Section 2) suggest that the majority of the ISA has been a relatively stable and depositional physical sediment environment over the last decade. Nearshore areas (i.e., sediment at water depths shallower than -20 feet CRD) are predominantly stable with episodic deposition, apart from localized disturbances by non-flow-related physical processes (e.g., wind-generated waves) and/or anthropogenic disturbances (e.g., prop wash, nearshore construction, dredging) (SEA 2002f). Channel areas from RMs 1.1 to 5.1 and RMs 7 to 9.7 are also predominantly depositional. A sediment transport/non-depositional zone occurs within the channel from RMs 5.1 to 7. The vast majority of Category 1 sediment samples were collected from nearshore areas, while very few (approximately 10) samples were collected from the channel from RMs 5.1 to 7. The evaluation of sediment stability will continue during the RI with the following types of data collections and evaluations:

- A third bathymetric survey has been completed and was provided to EPA in October 2003. An evaluation of the bathymetric changes using this new data set was provided to EPA in the Round 2 sediment and benthic toxicity testing FSP.
- A fourth bathymetry survey was completed in March 2004 following a relatively high flow event (approximately 140,000 cfs). These data will be available in the spring of 2004 to support the modeling effort (next bullet).
- Hydrodynamic and sediment transport modeling will provide important insights into the relative stability of sediment throughout Portland Harbor, including areas that may be expected to either erode or accrete under hydrodynamic conditions that have occurred since 1990 (the date of the earliest historical data used in this project). The technical approach memo for the modeling task is currently under EPA review.
- The Round 2 sediment and benthic toxicity testing FSP includes recommendations for sampling areas that have previously been sampled to assess the level of change in chemical concentrations. Chemical

concentration changes are anticipated due to analytical variability and environmental patchiness. However, if the pattern of chemical concentrations in a region of the ISA changes then the usability of the historic data in that area will need to be assessed.

- Radioisotope dating of sediment cores will likely occur in Round 2 when subsurface cores are collected. These data will provide information on the history of sediment deposition at the sample location.

The LWR is and will continue to be a dynamic river system, and it is inappropriate to assume that one data set may best represent conditions in the river. In fact, a combination of data sets that represent different points in time may best represent the range of conditions that could reasonably be expected to occur in the future. The analysis of sediment stability will help to define the areas that have the highest probability of changing over time.

The final consideration for determining data usability is evaluating the intended use of the data. For example, the historic database contains some samples with undetected concentrations of PCBs at high detection limits. From an analytical perspective, these data are Category 1 and acceptable for use. From a sampling design perspective, these data are not useful because of the uncertainty associated with concentrations below the high detection limits and additional sampling and analysis may be necessary. From a risk assessment perspective, these data are also likely not useful because of the uncertainty associated with concentrations below the high detection limits and therefore the risk associated with these concentrations cannot be defined. As another example, chemical data from areas that have been dredged are useful for assessing potential historic sources but are not useful for assessing current risk.

The majority of information for this assessment will be available following Round 2. This information includes evaluation of the third bathymetric survey, additional surface sediment chemistry, and results of hydrodynamic and sediment transport modeling. All existing Category 1 chemistry data to be used for any purpose during the RI/FS must first be evaluated to determine its suitability for use. Factors to be considered include, but are not limited to:

- The use of appropriate detection limits,
- Sample compositing techniques,
- Analytical methods,
- Age of data,
- Sample depth, and
- Whether the sample is located in an area of scour or deposition.

The comprehensive site characterization summary and data gaps analysis report that is prepared following Round 2 will contain an assessment of data usability based on available information. The RI report, prepared following Round 3, will contain an updated discussion of data usability.

5.0 PRELIMINARY CONCEPTUAL SITE MODEL

This section describes the preliminary conceptual site model (CSM) for the ISA that is based on the current understanding of the physical and biological characteristics of the LWR. The CSM is a written description and graphical presentation of the relationships between chemicals released into the environment and the receptors (human or ecological) that may be exposed. The primary components of a CSM are source(s), release mechanism(s), transport pathway(s), affected exposure media, exposure routes, and receptors. For an adverse effect to occur, each one of the above components must be present. The following sections present a model of the physical system (Section 5.1), including a summary of potential sources and potential release mechanisms, and a summary of the potential transport and exposure pathways to ecological (Section 5.2) and human receptors (Section 5.3). Additional details of the ecological and human health CSMs are found in Appendices B (ERA Approach) and C (HHRA Approach).

The preliminary CSM presented herein will be updated as a stand-alone report (updated CSM). The updated CSM will provide a detailed inventory of sources and pathways for chemicals to impact sediment, the groundwater/surface water Transition Zone, and surface water in the river. A revised CSM will be based on results of further review of upland groundwater and other source and pathway information and will be submitted to EPA in accordance with the project schedule (Section 9.5). The CSM will be further updated as information gathered at the Site triggers revisions or refinements of the CSM.

5.1 PHYSICAL CONCEPTUAL SITE MODEL

Figure 5-1 is the preliminary physical CSM that summarizes potential sources, release mechanisms, transport media, and exposure media in the ISA. Site history and site conditions that support the physical CSM can be found in Section 2 of this Work Plan. Each of these categories is discussed in the sections that follow.

5.1.1 Sources

Potential sources of chemicals to the ISA are detailed in Section 3 of this Work Plan. In total, sources that may affect or have historically affected sediment and water quality in the ISA include all point and nonpoint discharges or releases at the ISA and upstream of the ISA. Potential sources in the ISA include the full range of current and historical industrial and urban activities (see Table 3-1), including overwater activities and discharges from public and private outfalls. Potential sources located upstream and, to a much lesser extent, downstream (due to seasonal, tidally induced flow reversals in the river), include industrial, urban, agricultural, and silvicultural activities that may release chemicals to the river system that eventually are transported to the ISA.

5.1.2 Release Mechanisms

There are several potential release mechanisms by which chemicals may have reached or can reach the surface waters and sediments in the ISA (Figure 5-1). Point source releases include historic and on-going direct industrial discharges, outfalls associated with CSOs, and piped stormwater discharges. Nonpoint source releases include overland stormwater runoff from industrial, commercial, and residential areas adjacent to the ISA, as well as watershed-wide upstream source releases including runoff from agricultural and silvicultural areas in the Willamette basin. Other potential release mechanisms include spills (both land-based and in-water), wind- and precipitation-induced erosion and transport of soils, infiltration of liquids, leaching of buried wastes, chemical leaching from structures and vessels (discussed in Section 3.6), and chemical or biochemical processes that mobilize chemicals such that they migrate from soils and sediments to surface water and groundwater.

Erosion and Transport

Exposed surface soils in upland areas that drain to the river and are exposed along riverbanks can be eroded and transported to the river by runoff. Chemicals present in soils or adhering to soil particles may thereby be translocated to the river. The amount of potentially impacted soils that is exposed in the Portland Harbor area is expected to be relatively small, as the vast majority of the industrial area along the river is paved or covered by buildings. Therefore, erosion of impacted upland soils and transport to the river is not anticipated to be a major ongoing release mechanism at the ISA, although it may have been more significant in the past. Approximately half of the riverbank in the ISA is covered with various engineered materials. Erosion of exposed riverbank soils by episodic high river flows is likely to be a more significant mechanism than erosion of upland soil.

Chemicals in dust, soil, debris, and liquids present on impervious surfaces, such as roadways, parking lots, and building roofs, can be transported to the river by stormwater draining to outfalls within Portland Harbor. These materials collect on the impervious surfaces over time; therefore, it is anticipated that stormwater runoff events occurring after extended dry periods (e.g., early wet-season “first flush” storms) would transport relatively greater amounts of chemicals to the river than would individual, frequently spaced runoff events (e.g., mid-winter storms).

Wind erosion and transportation of chemicals in soil and dust is anticipated to be a relatively minor mechanism for releasing chemicals to the river. As mentioned above, there is little exposed soil in the industrial area along the river. Also, in comparison to other mechanisms, wind is not very effective at transporting significant mass from potential source areas to the river.

Infiltration, Leaching, Dissolution, and Adsorption

Chemicals may be present in soil as solids, dissolved constituents, or non-aqueous phase liquids (NAPLs), including light non-aqueous phase liquids (LNAPLs) and

dense non-aqueous phase liquids (DNAPLs). Liquids released to soil may infiltrate and percolate through the soil column to groundwater as diagrammed in Figure 5-2a.

LNAPLs released to soil will migrate vertically downward to low-permeability zones or to the water table where unrestricted. Thus, the vertical distribution of LNAPLs in the unsaturated zone is controlled by the depth of the water table, as well as by the vertical permeability and sorptive capacity of the sediments. Lateral migration of a LNAPL is controlled by (1) the gradient of the groundwater surface, (2) the presence of permeable layers within the uppermost-saturated unit, which is usually fill or undifferentiated fine-grained sediments, (3) the volume and rate of the release, (4) the presence or absence of human-made or natural preferential pathways, and (5) the physical characteristics of the LNAPL. At the groundwater surface, LNAPLs typically produce a dissolved plume for chemicals, such as aromatic volatile organic compounds (VOCs) [e.g., benzene, toluene, ethylbenzene, xylenes (BTEX)] and other chemicals that may extend some distance downgradient from the LNAPL itself. Attenuation processes, such as biodegradation, adsorption to soil particles, and various geochemical processes, affect the migration of dissolved organic plumes. The degree that these processes naturally attenuate a given plume and limit migration from the source depends on the groundwater conditions, aquifer matrix and the type of organic compound. Aromatic volatile compounds such as BTEX may be strongly attenuated through geochemical and biodegradation processes, whereas attenuation of chlorinated solvents and other recalcitrant compounds along the plume flow path may be minor due to low affinity for partitioning to the aquifer matrix and resistance to degradation under many conditions.

The vertical transport of DNAPLs is controlled by (1) the volume and rate of the release, (2) the specific gravity of the liquid, (3) the relative mobility of the constituent (the viscosity and the relative affinity for sediments), and (4) layering or permeability contrasts within the hydrogeologic units underlying the source area. The presence of laterally extensive, low-permeability materials will tend to mitigate the depth of penetration of a DNAPL. The fill and fine-grained alluvial sediments in the vicinity of the ISA tend to be highly stratified, and the resultant permeability contrasts tend to cause spreading of a DNAPL source along the upper surface of low-permeability layers. However, if the DNAPL release encounters discontinuities in low-permeability layers or coarse-grained alluvial sediments, as is expected in an alluvial system such as the Willamette River, penetration to greater depths may occur, which could result in an ongoing dissolved plume source in the deeper flow systems discharging to the river. Experience at other locations, such as the Port of St. Helens/Pope & Talbot site, has shown that a DNAPL commonly perches and flows on top of the CRBG (see Section 2.1.1) unless or until it encounters a fracture that penetrates the entire basalt flow to the next interflow which allows deeper migration and spreading (GeoEngineers 2000).

Dissolved constituents in groundwater may have a source in a LNAPL or DNAPL mass, in chemicals leaching from soil or buried wastes, or in a spill of a dissolved

solution (e.g., process water). Chemical adsorption to soil (or sediment), partitioning between soil/sediment and water, and dissolution to water are closely related processes. The physico-chemical properties (e.g., soil/water partitioning coefficient: K_d ; organic carbon partitioning coefficient: K_{oc}) of individual chemicals control, in part, the degree to which a chemical moves from the source material or soil to groundwater. Some chemicals are strongly held by soil/sediments while others have an affinity for water. These same properties also affect how chemicals partition between soil or sediment and surface water. For organic chemicals, the K_{oc} of the chemical and the organic carbon fraction of the soil or sediment will generally govern the degree to which chemicals are sorbed to soil or sediment. For example, PCBs and HPAHs have relatively high K_{oc} values and are strongly sorbed to soil or sediment while LPAHs and chlorinated solvents have lower K_{oc} values and more readily partition to the water phase. Because soil sources and groundwater (and sediment sources with overlying surface water) are not in equilibrium due to continual dilution with fresh (clean) water and diffusion of chemicals, the dissolution process is ongoing rather than static, and the more mobile constituents will be desorbed and transported away, reducing the overall mobility of the remaining material. Inorganics also undergo leaching and dissolution but unlike organics their soil/water partitioning coefficients (K_d) are not influenced by organic carbon. Instead, metal solubilities and adsorption can vary widely and are controlled by oxidation state, speciation, associated counter ions, water pH and oxidation-reduction potential, soil particle size, the presence of chelating agents and ligands, and type of mineral phases present.

Other release mechanisms include sediment resuspension and transport, sedimentation of suspended particulates from surface water, chemical precipitation of dissolved constituents from surface water, and groundwater discharge to the Transition Zone. These mechanisms are discussed in the next section, because although they can be post-primary release mechanisms, they are mainly inter-media transport mechanisms.

5.1.3 Transport Media and Mechanisms

Sediment, surface water, groundwater, resuspended soil, and airborne particulates (i.e., dust) are the primary media in the ISA by which chemicals are moved from source areas to locations where exposure to receptors occurs. The physical and chemical processes that govern the movement and interactions of these media also control the movement of chemicals into and through the ISA.

Sediment Transport

Sediment transport (deposition, resuspension, redeposition) is an important mechanism in the LWR physical system. Sediments containing chemicals can be resuspended and redeposited many times within the LWR. With each sediment transport cycle, the concentrations of chemicals in the sediment are modified by incorporation of sediment containing concentrations reflective of upstream areas.

This process is anticipated to substantially attenuate chemical concentrations in sediment with increasing distance from sources.

The movement of sediment through the Portland Harbor navigation channel appears to be controlled, in large part, by the physical shape of the river, both the cross-sectional area and anthropogenic factors (borrow pits and dredged areas). Upstream of the ISA from Willamette Falls to about RM 11, the river tends to be narrow with sustained current speeds that apparently prevent all but the coarsest material from being deposited for the long term in the main stem of the river. From RM 11 to RM 10, the river broadens considerably and suspended and bedload material tends to deposit in a depositional reach that extends from about RM 10 to about RM 7, particularly in the deeper depressions. From RMs 7 to 5, the river cross-section again narrows and suspended sediments are likely transported through this reach, while the degree of bedload sediment deposition and transport is likely a function of temporally varying hydrology. The channel in the lower part of the ISA, RMs 5 to 3.5, again widens and appears to be depositional. Downstream of the ISA, the broad, depositional channel continues to around RM 1.5; the river then narrows again and becomes more dynamic as it reaches the Columbia.

In off-channel, nearshore areas, the general trends described above for the channel are altered by local riverbank morphology, bank treatments, and anthropogenic factors. The elevation change maps produced by comparing the winter 2001/2002 and summer 2002 bathymetry surveys (see Map 2-7) indicate that:

- Areas of shoaling and deepening are more widespread in shallow nearshore areas than in the main navigation channel.
- Many areas of nearshore deepening appear to be closely associated with pier structures, berthing areas, or slips and are likely the result of anthropogenic factors (e.g., prop wash).
- Bridge footings create localized areas of deep scour and accretion.
- An apparently natural stretch of nearshore shoaling extends along the west side of the river in the ISA from RMs 4 to 5, while a stretch of natural nearshore scour extends along the west side of the river downstream of the ISA from RMs 0 to 3.

In general, particulates from upstream sources that are transported into the ISA would be expected to accumulate in depositional areas of the ISA. Depositional areas would be expected to contain chemicals that are characteristic of historic and ongoing upstream sources, in addition to any ISA-related sources. Depending on temporally varying flow conditions, some portion of the suspended sediments that enters the Portland Harbor would settle out in depositional areas. Suspended sediments also likely pass through the Portland Harbor, especially during high-flow velocity events.

It is also evident that impacted sediments (originating upstream or from within the ISA) have the potential to be disturbed and resuspended by anthropogenic factors, such as prop wash and dredging. Their subsequent transport and fate would be a function of the LWR flows at the time of disturbance. Finally, despite the apparently dynamic sediment transport environment in the ISA, the relative magnitude and areal extent of impacted sediments near documented contaminated sediment areas have tended to be consistent over time, suggesting that there are subareas in the system that may be relatively stable. The spatial and temporal sediment transport patterns in the ISA will be further evaluated during the RI/FS.

In addition to direct measurements of riverbed elevation change through time-series bathymetry, a hydrodynamic and sediment transport model will be developed as part of the physical CSM refinement process. A major objective of the model will be to supplement this view of sediment transport in the ISA and LWR. In particular, sediment transport patterns in both major flood and non-flood years will be modeled. The modeling results and other Round 2 sampling (surface and subsurface sediment chemistry) will be evaluated, and these data will be used to refine the physical CSM.

Surface Water

Chemicals may be transported in surface water as suspended particulates, dissolved constituents, and oily films. Chemicals in surface water may originate from upstream sources, direct discharges or releases within the ISA (e.g., outfalls, groundwater discharges), deposition from the air, or resuspension of sediment within the ISA (described under Sediment Transport above). Suspended particulates in surface water are most likely to settle from the water column in relatively quiescent areas of the ISA (e.g., Swan Island Lagoon). During higher rates of flow in the LWR, coarser particulate material that is normally deposited as sediment may be temporarily suspended and added to the water column load. Similarly, water column loads during stormwater runoff events will be higher in the vicinity of discharge points, such as outfalls. Dissolved constituents generally remain in the water column except where chemical or biological processes cause precipitation or adsorption. Volatilization and photolysis may also transform some chemicals in the upper portion of the water column.

Groundwater

Groundwater-related components of the RI/FS will focus on understanding the potential for contaminated groundwater to affect sediments and surface water in the Willamette River. Dissolved chemicals in groundwater most likely will be transported toward the river by groundwater flow. As described in Section 2.1.3, groundwater in the vicinity of the ISA discharges via seeps above the water line or to the Transition Zone below the water line (Figure 5-2a; see Section 2.1.4). Transport of dissolved chemicals of interest (COIs) in groundwater is controlled by advective processes related to the physical hydrogeology (i.e., gradient, permeability) and the physicochemical properties of the chemical(s) and materials in the saturated zone, as well as the plume source and initial concentration in the plume.

Impacted groundwater entering the river could affect chemistry in sediments (including Transition Zone water and the sediment matrix) and in the water column. However, due to the large flow volumes in the river, effects of groundwater constituents on the overall surface water column concentrations are expected to be minimal due to dilution, except adjacent to the sediment/surface water interface in groundwater discharge zones. The effect of groundwater discharges on near-sediment surface water will be conservatively assessed through evaluation of chemical concentrations in water within the bioactive zone. The potential effects in the bioactive layer of the Transition Zone are more likely to be important in evaluating the relative risk to aquatic receptors, and to risk management decisions.

Behavior of chemicals in groundwater is important to the evaluation of potential transport and exposure. Chemicals in groundwater may partition to sediments or pass through the sediments to impact the Transition Zone water and/or surface water. The partitioning process is complicated and depends on the geochemistry of the sediment matrix and the groundwater, as well as the type of chemical. Halogenated and aromatic VOCs, low molecular weight (three or fewer aromatic rings) PAHs and certain species of metals generally exhibit a relatively low affinity for sediments and thus will pass through soil and sediment in the absence of other transformation or attenuation processes. However, these more mobile compounds may partition to aquifer materials and sediments under certain conditions (e.g., from anaerobic zones to more oxygenated zones). Other chemicals, such as pesticides, high molecular weight (four or more aromatic rings) PAHs and some metals, tend to adsorb or bind to soils or sediments, particularly where organic carbon is present, and may have lower tendency to be transported in aqueous phases or to partition from sediments to Transition Zone water. However, transport of these types of chemicals may be enhanced, on occasion, under certain geochemical conditions, in the absence of organic carbon, or in certain instances where the presence of another chemical increases the mobility of the chemical, thereby increasing the potential to be transported to the Transition Zone.

The assessment of potential impacts to the Transition Zone water and surface water from chemicals in groundwater will require evaluation of fate and transport characteristics of site-specific contaminants in groundwater on a site-by-site basis. The chemical attributes discussed above are described in more detail in Section 7.2.3 as they relate to the proposed approach for evaluating risk from groundwater COIs.

Four potential groundwater chemical transport scenarios relevant to the project have been identified (see Figure 5-2b). The scenarios are described below:

1. **Impacted groundwater from an upland source that flows through clean sediment:** In this scenario, some portion of the chemicals transported in groundwater partitions to sediments, potentially causing sediment-related impacts, or flows in the dissolved phase to potentially cause impacts to Transition Zone water or the surface water column. The potential impact to

sediment, Transition Zone water, and the water column depends on the concentration(s) of the chemicals in groundwater as well as the affinity of each chemical for the sediments. The greatest impacts to sediments and Transition Zone water occur where a NAPL is transported to the river through sediments or where the source of groundwater constituents is located near the river and high contaminant concentrations in groundwater are observed. In general, an aqueous-phase plume with a long flow path from its source to the river will likely have relatively less effects than a plume with its source near the river, as partitioning and transformation processes will reduce the concentrations prior to reaching the Transition Zone. Section 7.2.3 describes the approach for assessing chemicals in groundwater at concentrations of concern that partition to the solid or aqueous phase within this zone.

2. **Subareal surface seepage of impacted groundwater:** This scenario refers to shallow impacted groundwater that comes to the ground surface above the water line and then discharges to the river as a seep. After the groundwater discharges to the ground surface as a seep, it is available for human contact and is the only groundwater pathway that may result in potentially complete exposure pathways.
3. **Impacted groundwater from an upland source flows through impacted sediments:** In this scenario, impacted groundwater mobilizes chemicals from impacted sediments and advects in the dissolved phase to potentially cause impacts to sediment or water within the Transition Zone.
4. **Clean groundwater flowing through impacted sediments (no upland chemical source):** In this scenario, chemicals present in buried sediments may partition to groundwater flowing through the sediments toward the river. Some chemicals could then repartition to the shallower sediments further along the flow path and/or potentially cause dissolved-phase impacts to water within the Transition Zone. This scenario also is a potential mechanism of contamination to overlying clean sediments (if in a depositional area) or a sediment cap. The impact of this scenario depends on the characteristics of the buried contaminated sediments and groundwater flux rates. In more permeable sediments, the concentrations in groundwater will be limited by partitioning rates from the sediment source. The impacts to overlying sediments under this scenario are expected to be relatively low where sediment sources have been present for several decades and do not include NAPL.

Soil

Resuspended soil is not considered to be a very substantial transport medium in the ISA given the highly developed nature of the harbor area. Runoff and slope processes may transport soil downhill toward the shoreline along the steeper riverbanks that are not vegetated or covered with engineered structures. In limited locations, soil transport may move impacted soil to elevations that are more frequently affected by the river.

Airborne Particulates

The transport of chemicals by airborne particulates is not considered to be a very substantial transport mechanism in ISA.

5.1.4 Exposure Media

As shown in Figure 5-1, the exposure media in the physical CSM are surface water, sediment, water within the Transition Zone, and biota. Chemicals that are either in dissolved or particulate form may be concentrated in surface water, bedload, suspended sediments, or water within the Transition Zone in the ISA. From these physical media, chemical constituents are potentially exposed to ecological (Section 5.2) and human (Section 5.3) receptors of concern, which represent the exposure endpoints in the CSM for the ISA.

5.2 ECOLOGICAL CONCEPTUAL SITE MODEL

This section summarizes the current understanding of the potential exposure routes and pathways from affected media to ecological receptors in the ISA. The preliminary ecological CSM (Figure 5-3) identifies the sources, release mechanisms, exposure media and routes, and potential receptors, and characterizes the various exposure pathways for potential ecological receptors within the ISA. The physical CSM, described in Section 5.1, provides a preliminary identification of sources, release mechanisms, and exposure media. The rationale for selecting the ecological receptors and exposure pathways is included in Appendix B. An understanding of the ecological CSM is needed to complete the ecological risk assessment (ERA).

Data provided by the Round 1 sampling program will facilitate a preliminary understanding of the potential ecological risks associated with exposure to chemicals in sediment and tissue. A preliminary risk evaluation report will be developed following Round 1. Additional data will be collected in subsequent rounds of investigations. This information will advance the current understanding of the ecological CSM, which will continue to be revised based on additional data.

The majority of the ISA is industrialized, with modified shoreline and nearshore areas. Wharves and piers extend into the channel, and bulkheads and riprap revetments armor the riverbank. Dredging has produced a uniform channel with little

habitat diversity. However, some segments of the ISA, as well as areas upstream and downstream of the ISA, are more complex with side channels, shallow water areas, and less shoreline development, providing habitat for a suite of local fauna. A description of the general types of habitat in the LWR available to ecological species is presented in Appendix B.

5.2.1 Potential Ecological Receptors

Various organisms are present in the ISA (see Appendix B), with each organism relating to its environment in unique ways that determine its exposure to chemicals. Though each species has unique habitat requirements and behavior, several species are often similar in their use of resources and potential exposure to chemicals. Thus, representative species from each group are selected to typify other species with similar exposure. In this preliminary ecological CSM, potential ecological receptors are grouped into aquatic plants, benthic invertebrates, fish species, amphibians, reptiles, birds, and mammals.

The rationale for selection of representative species is presented in Appendix B. Example food web diagrams for fish and wildlife are presented in Figures 5-4 and 5-5, respectively. A summary of the potential receptor groups is provided below.

Aquatic Plants

Aquatic plants were identified within the ISA in the Round 1 reconnaissance survey (see Appendix B, Attachment B2). Therefore, aquatic plants are exposed to potentially impacted sediment and surface water and will be assessed as a population to the extent possible. A discussion of aquatic plants is presented in Appendix B.

Benthic Invertebrates

Benthic invertebrates are typically evaluated at the community level because many species are collocated in a localized “community” with little to no movement occurring within the habitat. Therefore, a community-level assessment of benthic invertebrates will be conducted in Portland Harbor. A population-level assessment will also be conducted, as feasible. However, due to practical limitations and the available exposure and toxicity information, the population assessment will likely be more qualitative. Remedial decisions will be based on a community assessment.

The details of the epibenthic and infaunal invertebrate community assessment are presented in Appendix B, Attachment B4. In addition, as representative macrofauna, crayfish will be assessed separately in the preliminary and baseline risk assessments because they have relatively longer life spans than other invertebrates and they consume detrital material. Likewise, mollusks will be assessed, but separately

Fish Species

Consistent with the criteria and rationale presented in Appendix B and with EPA (1998) guidance, representative fish species were selected and approved by EPA for the baseline ERA. The representative species are presented below by feeding guild:

- **Herbivores/Omnivores:** The largescale sucker was selected to represent omnivorous and herbivorous fishes because of its close association with sediments.
- **Invertivores:** Juvenile chinook salmon was selected to represent anadromous invertivorous fish species because it is a federally listed threatened species occurring in the ISA. Sculpin was selected to represent resident invertivorous fish species because of its close association with sediments and small home range. In addition, the peamouth was selected to represent resident insectivorous fishes, feeding similarly to the juvenile salmon, but spending more time in the ISA.
- **Piscivores:** The northern pikeminnow was selected as a representative of piscivores because it is long-lived and feeds at the top of the food chain. Smallmouth bass was also selected as a representative species for piscivores because of their smaller home-range size relative to northern pikeminnow.
- **Detritivores:** Juveniles (ammocoetes) of the Pacific lamprey were chosen as the representative species for detritivorous fish species. The ammocoete also represents a sensitive life-stage.

Amphibians and Reptiles

Amphibians were identified in selected locations within the ISA during the Round 1 reconnaissance survey (see Appendix B, Attachment B2) and were selected as a receptor group. Amphibians will be evaluated in areas where they may breed within the ISA (e.g., where a sensitive life-stage may be exposed). Amphibians have been selected as a surrogate for reptiles because amphibian exposure to chemicals is expected to be higher than reptiles, amphibians tend to be more sensitive, and toxicity information for reptiles is less abundant than for amphibians.

Birds

The osprey was chosen as the representative species for the piscivorous birds. Additionally, the bald eagle will be evaluated at the individual level because it is a federally listed threatened species occurring in the ISA. Sediment-probing invertivorous birds are represented by the spotted sandpiper. The spotted sandpiper is also considered a conservative surrogate species for omnivorous birds. The hooded merganser was chosen to represent diving birds. Herbivorous birds have limited exposure to chemical constituents in the LWR, and estimated total exposure for sediment-probing invertivores is assumed to be a conservative estimate of total exposure to herbivorous birds.

Mammals

Mink were selected to represent carnivorous mammals that may use the ISA.

5.2.2 Potential Exposure Pathways

This section describes the potential chemical exposure pathways to species in the ISA and discusses which pathways will be evaluated for the various receptor species in the ERA. Representative species can be exposed to chemicals in water or sediment in the ISA either directly through contact with sediments, water within the Transition Zone, or surface water or indirectly through the food chain. The CSM (Figure 5-3) illustrates the pathways that chemicals may follow from primary sources to the ecological species. Exposure pathways were designated as follows:

- **Complete and Major:** Pathway is complete and expected to be a significant contributor to total exposure. This pathway will be quantitatively assessed, when possible, in the preliminary risk evaluation or baseline risk assessment.
- **Complete and Minor:** The pathway is complete and expected to be a minor component of total exposure. In relation to other complete pathways, chemical exposure is expected to be minimal. This pathway will not be quantitatively evaluated in the preliminary risk evaluation or baseline risk assessment unless sufficient data are available, but will be discussed qualitatively to a level of certainty dependent on available studies. If the data are insufficient, additional information will be gathered through an interim sampling process and the risk evaluated if the pathway is believed to potentially contribute significantly to overall risk.
- **Complete and Uncertain:** The pathway is complete but of undetermined significance. If there are insufficient toxicological data, this pathway will not be quantitatively evaluated in the preliminary risk evaluation or baseline risk assessment, but will be discussed qualitatively to a level of certainty dependent on available studies. However, if the uncertainty is due to lack of site-specific data, appropriate information will be collected and a determination made whether the pathway is major or minor. If sufficient toxicological data exist, the pathway will be evaluated using multiple lines of evidence, including sediment chemistry, bioassays and an evaluation of groundwater contribution.
- **Incomplete:** The pathway is incomplete; therefore, it will not be evaluated in the preliminary risk evaluation or baseline risk assessment.

The specific exposure pathway assignments are summarized by receptor in the remainder of this section.

Aquatic Receptors

Aquatic Plants

Aquatic plants actively and passively transfer chemicals from surface water and sediments; therefore, these contact pathways are considered the only complete pathways of exposure to these receptors in the ISA.

Benthic Invertebrates

Infaunal and Epibenthic Invertebrates

Infaunal and epifaunal benthic invertebrates are generally in direct contact with sediments and surface waters. Therefore, direct sediment and water contact are considered complete and major pathways of exposure (Figure 5-3). Surface water ingestion is considered a complete and minor pathway of exposure for infaunal and epifaunal invertebrates. The sediment ingestion pathway is considered complete and major. Biota ingestion for infaunal and epifaunal organisms is also considered a complete and major pathway of exposure.

The influence of groundwater on Transition Zone water quality in the ISA cannot be determined at this time due to lack of Transition Zone water data within the ISA. Direct contact with water within the Transition Zone is considered a complete and uncertain pathway for benthic infauna. The Transition Zone water pathway will be assessed if the results of the groundwater evaluation indicate effects on water quality within the Transition Zone and potentially complete pathway to benthic infauna (see Section 7.3). The Transition Zone water pathway would only potentially affect benthic infauna in the biologically active zone. For all other receptors, this pathway is considered incomplete.

Mollusks

Direct sediment, Transition Zone water, and surface water contact are considered complete and major pathways of exposure for mollusks (Figure 5-3). Sediment ingestion is also considered a complete and major pathway of exposure for mollusks because they are known to routinely ingest sediment. Water ingestion is considered a complete and minor pathway. Biota ingestion is considered a complete and major pathway because mollusks' diets can consist of other benthic organisms and detritus.

Epibenthic Macrofauna

Crayfish are in direct contact with surface water and sediments, and this pathway is considered complete and major (Figure 5-3). Crayfish ingest sediments directly and indirectly; therefore, this pathway is considered complete and major. Surface water ingestion is considered a complete and minor pathway of exposure. Finally, crayfish diets consist of other benthic organisms, detritus, and dead fish. Therefore, biota ingestion is considered a complete and major pathway of exposure.

Fish

Omnivore/Herbivore - Largescale Sucker

Direct contact with sediments, sediment ingestion, and ingestion of benthic biota are considered to be complete and major pathways of exposure for the largescale sucker (Figure 5-3). In addition, largescale suckers are in direct contact with surface water, thus, this pathway is also considered a complete and major pathway of exposure for this receptor. Incidental ingestion of water may occur for the largescale sucker, as for all the fish species; however, this pathway is considered complete and minor.

Invertivore - Sculpin Species

Direct sediment and surface water contact are considered complete and major pathways of exposure for sculpin (Figure 5-3). Water ingestion is considered a complete and minor pathway. Because sculpin may prey upon sediment-ingesting organisms such as epibenthic invertebrates, sediment and biota ingestion are also considered complete and major pathways of exposure.

Invertivore - Peamouth

Peamouth are in constant contact with surface water and this pathway is considered complete and major (Figure 5-3). Ingestion of surface water is a complete and minor pathway. The diet of the peamouth consists of benthic invertebrates, crustaceans, and small fish. Therefore, the ingestion of biota is a complete and major pathway. While feeding, peamouth may ingest sediments directly through their mouth or indirectly through their prey. The amount of sediments ingested with prey could be significant when peamouth feed on benthic organisms. However, fish species are also a portion of the peamouth diet. Therefore, this pathway is considered complete and uncertain. Peamouth are benthopelagic species and direct contact with sediment will occur when feeding on benthic prey. However, benthic species comprise only a part of the peamouth diet, and peamouth spend a significant portion of time in the pelagic zone. Therefore, direct contact with sediments is considered a complete and minor pathway.

Invertivore - Juvenile Chinook Salmon

Surface water contact is considered a complete and major pathway of exposure (Figure 5-3) for juvenile chinook salmon. Ingestion of prey is also considered a complete and major exposure pathway. The sediment ingestion pathway is considered complete and uncertain. The sediment ingestion pathway for metabolized chemicals will be addressed qualitatively. Direct contact between juvenile chinook salmon and sediments, and ingestion of surface water, are assumed to be complete and minor pathways.

Piscivore - Smallmouth Bass

Ingestion of biota is considered a complete and major pathway of exposure (Figure 5-3) for the smallmouth bass. The ingestion of water is considered a complete and minor pathway of exposure. Smallmouth bass are in constant contact with water. Thus, direct contact with surface water is a complete and major pathway of exposure. Direct sediment contact and ingestion are considered complete and minor pathways.

Piscivore - Northern Pikeminnow

Northern pikeminnow are in constant contact with surface water, and this pathway of exposure is considered complete and major (Figure 5-3). Adult northern pikeminnow primarily consume fish. Thus, ingestion of biota is considered a complete and major pathway of exposure. Northern pikeminnow, like smallmouth bass, is a benthic-pelagic species and will be occasionally in direct contact with the sediment and may ingest some sediment directly and indirectly from their prey. Ingestion of surface water and sediment and direct contact with sediment are all considered complete and minor exposure pathways.

Detritivore - Pacific Lamprey ammocoetes

Pacific lamprey ammocoetes live in direct contact with sediments and often filter food (e.g., detritus, diatoms) directly from sediment. Therefore, direct sediment contact and ingestion of sediments and biota are considered to be complete and major pathways of exposure for Pacific lamprey ammocoetes (Figure 5-3). In addition, surface water contact is also considered complete and major pathways of exposure for this species. Ingestion of surface water is a complete and minor pathway.

Amphibians and Reptiles

Direct contact with surface water is considered a complete and major pathway to amphibians. Direct contact with sediment is considered a complete and uncertain pathway to amphibians and reptiles. The food ingestion pathway is considered complete and major for both amphibians and reptiles. Surface water ingestion is considered a complete but minor pathway for amphibians and reptiles.

Wildlife Receptors

Birds

Piscivore - Osprey and Bald Eagle

Food ingestion is considered a complete and major pathway of exposure for the osprey and bald eagle (Figure 5-3). Sediment ingestion is considered a complete and minor pathway of exposure for bald eagle. Because surface water contact and ingestion and direct sediment contact are likely to be minimal, these pathways are considered to be complete but minor pathways.

Diving Carnivore/Omnivore - Hooded Merganser

Food ingestion is considered a complete and major pathway of exposure for the hooded merganser (Figure 5-3). Sediment ingestion is also considered a complete and major pathway. Surface water contact and ingestion and direct sediment contact are considered incidental occurrences and complete but minor pathways of exposure.

Sediment-probing Invertivore/Omnivore - Spotted Sandpiper

Food ingestion is considered a complete and major pathway of exposure for the spotted sandpiper (Figure 5-3). In addition, sediment ingestion is considered a complete and major pathway of exposure. Surface water contact and ingestion are

considered complete but minor pathways. Direct sediment contact is considered a complete but uncertain pathway.

Mammals

Carnivore - Mink

Food ingestion by mink is considered a complete and major pathway of exposure (Figure 5-3). Sediment ingestion is considered a complete and major pathway of exposure for carnivorous mammals. Surface water contact by swimming and ingestion is considered complete and minor. Direct contact with sediment is considered complete and minor.

Additional data provided by Round 1 and later sampling programs will be used to further characterize the ecological risks associated with exposure to chemicals in sediments, water, and tissues and to refine the ecological CSM.

5.3 HUMAN HEALTH CONCEPTUAL SITE MODEL

This section summarizes the current understanding of the physical and biological setting of the ISA as it pertains to potential impacts to human health. The CSM for human exposures, based on the current understanding of conditions in the ISA, is presented in Figure 5-6. The rationale for selecting human receptors and exposure pathways is included in Appendix C.

The CSM graphically depicts possible sources of chemicals, possible chemical-affected media, mechanisms of chemical transfer between media, receptors that may be exposed to chemicals associated with the ISA, and potential exposure pathways. Possible sources of chemicals and possible mechanisms of chemical migration and transfer are described in the physical CSM (see Section 5.1). The human health CSM focuses on potential human receptors and potential exposure pathways to those receptors. Only exposure pathways that are theoretically complete and potentially significant (including those pathways of uncertain significance) will be evaluated quantitatively in the baseline human health risk assessment (HHRA).

Data provided by the Round 1 sampling program will allow a preliminary understanding of the human health risks associated with exposure to chemicals in beach sediment and tissue. Additional data will be collected in subsequent rounds of investigations. This information will advance the current understanding of the human health CSM, which will continue to be revised based on additional data.

5.3.1 Potential Human Receptors

Potentially exposed populations were identified based on consideration of current and future uses of the Site and EPA (1989) guidance. The potential current and future human receptors identified below represent those receptors that are anticipated to be

present under current and reasonably foreseeable future conditions. The selected receptors are anticipated to be protective of other potential receptors that will not be evaluated quantitatively in the baseline HHRA. As shown in the CSM, the receptors for current and future uses include the following:

- Dockside worker
- Transient
- Recreational beach user
- Recreational fisher
- Native American consumption fisher
- Non-Tribal high consumption fisher.

The receptors were identified based on human activities that are known to occur within the ISA. It is assumed that the recreational beach user, which includes exposure to surface water during swimming activities, will be protective of divers in Portland Harbor. This assumption will be reassessed when additional information regarding divers in Portland Harbor becomes available, and, if needed, a diver receptor may be included in the HHRA.

5.3.2 Potential Exposure Pathways

Exposure pathways are defined as the physical ways in which chemicals may enter the human body (e.g., ingestion, inhalation, dermal absorption). A complete exposure pathway consists of the following four elements:

- A source of chemical release
- A retention or transport medium (or media in cases involving media transfer)
- An exposure point (a point of potential human contact with the contaminated medium)
- An exposure route (e.g., ingestion, dermal contact) at the exposure point.

If any of the above elements is missing, the pathway is considered incomplete and exposure does not occur.

As discussed in Section 4, the currently known and identified affected media in the ISA are sediment and water. In addition, some chemicals in sediment may be taken up by bottom-dwelling organisms. As fish species feed on these organisms, the chemicals may bioaccumulate in the fish tissue. The potential exposure pathways identified are:

- Ingestion of sediment and surface water
- Dermal contact with sediment and surface water
- Ingestion of fish and shellfish.

The baseline HHRA will focus on potential exposures occurring within the ISA, and areas outside the ISA that are identified by the RI process, to quantify risks to human receptors. However, certain receptors may also be exposed to media at upland sites adjacent to the ISA. The baseline HHRA will acknowledge that additional upland exposures may occur, and these potential risks will be addressed by DEQ through upland activities.

Each scenario is described in detail in Section 3 of Appendix C. Potentially complete and significant or potentially complete and significance unknown exposure pathways shown in Figure 5-6 will be evaluated quantitatively. Pathway designations and the rationale for each pathway for each receptor are also explained in Section 3 of Appendix C.

Current and Future Dockside Worker

Industrial and commercial workers at facilities near the river are exposed to sediments and water only when they are conducting site-specific activities within natural river beach areas. These activities generally occur infrequently, but they may provide opportunities for industrial and commercial workers to have dermal contact with and/or incidental ingestion of intertidal sediments (river beach sediments located between the high- and low-water lines). Dermal contact with or ingestion of water that may occur during occupational activities would be unintentional and infrequent. Dockside workers do not consume fish through occupational activities.

Current and Future Transients

During past site tours, tents and makeshift dwellings were observed as evidence that individuals were occupying some riverbank areas. These transients may have dermal contact with water and intertidal sediments within natural river beach areas they are utilizing. Incidental ingestion of surface water and intertidal sediments may also occur through activities of these transients, and transients may be using the river as a source of drinking water. Transients may also be consuming fish and shellfish; however, no information is available regarding this potential exposure pathway, and it will not be evaluated under this scenario, but is considered a potential data gap.

Current and Future Recreational Beach User

Adults and children use the LWR for boating, water skiing, swimming, and other water activities. Ongoing, long-term, repetitive beach use will be the focus of the baseline HHRA, as it is anticipated to result in the greatest risk as compared with other recreational receptors. Recreational beach users may have dermal contact with, and incidental ingestion of, water and intertidal sediments during activities within river beach areas. Recreational beach users do not consume fish through beach use activities.

Current and Future Fishers

Three fisher receptors (recreational fishers, Native American consumption fishers, and non-Tribal high consumption fishers) will be evaluated in the baseline HHRA. The fisher categories are differentiated by the frequency of fishing and by the amount of fish consumed. Each scenario is described in detail in Section 3 of Appendix C. Fishers may consume fish and shellfish that are caught from the Site and may also have dermal contact with, and incidental ingestion of, sediments at banks within the Site where fishing occurs, and in water. Dermal contact with or ingestion of water that may occur during fishing activities within the Site would be infrequent.

Potentially Overlapping Scenarios

Potential risks will be quantified for each receptor; however, certain individuals may participate in activities resulting in potential exposures under more than one category (e.g., recreational beach users may also be recreational fishers). The combination of exposures for an individual through different receptor categories will be evaluated further in the baseline HHRA.

6.0 OVERVIEW OF PORTLAND HARBOR RI/FS PROCESS

This section presents the overall process for completing the RI/FS and ultimately obtaining a Record of Decision (ROD) for the Site. It describes in general terms the major milestones that will be achieved during the RI/FS process. While this section provides the general accomplishments for each of the major milestones and how the milestones relate to each other, the specifics of how these milestones will be achieved are presented in Sections 7 and 8.

In order to develop an approach for obtaining a ROD, the LWG and EPA first defined the objectives for the ROD and the major issues that the ROD may address. Next, the LWG identified the types of information needed to accomplish those objectives and address the issues. Finally, the LWG grouped information needs into logical sequences or phases of work. These work phases support major milestones such as the RI, ERA, HHRA, and FS. The LWG and EPA refer to this process as a “road map,” as it details the paths and tasks along those paths necessary for completing the RI/FS and ROD.

It is anticipated that four rounds of data collection efforts conducted by the LWG will be used in conjunction with the Category 1 historic information to provide the site-specific data needs to complete the RI, baseline risk assessment, and FS reports:

- Data collected prior to signing of the AOC (pre-AOC)
- Data collected in Round 1
- Data to be collected in Round 2
- Data to be collected in Round 3.

However, additional sampling rounds may be required to address data gaps identified as a result of technical memorandum development, review of Round 1 data, Round 2 data, or review of relevant new data or information.

The objectives of these sampling efforts, described in Section 6.2, generally include obtaining sufficient information to assess site-wide risk and understand the distribution of chemical constituents sufficient to support the development of the RI and baseline risk assessment reports. As with most CERCLA projects, these documents will be the transition point to the FS. The fourth round of data collection (referred to as Round 3) will focus on providing information for the FS, but will also serve as a final opportunity to address any outstanding site characterization or risk characterization issues. The completion of the Round 3 sampling effort will lead to the draft FS report.

Several important procedural steps are required prior to the ROD, such as approval of the FS, development of a draft proposed plan for public review and comment, and completion of a final proposed plan. For this road map to be successful, it is important that all of the parties understand the objectives of each sampling and data

evaluation round and how these objectives will be accomplished (i.e., what data will be collected and how those data will be evaluated).

6.1 PRELIMINARY REMEDIAL ACTION OBJECTIVES

Data needs for assessing the distribution of in-river chemicals, human health and ecological risks, and for developing remedial alternatives for the ISA were identified based on a review of preliminary remedial action objectives (RAOs) historical data and information developed as part of EPA's (2000a) DQO process. A technical memorandum that presents preliminary RAOs for this site is summarized in Section 8.2 and found in Appendix A, Attachment A1. Specific definitions of the terms used in the preliminary RAOs are provided in Section 8.2 and the attachment.

Preliminary RAOs that were used to identify the categories of data that will be needed to fulfill project objectives include the following:

1. Reduce human health risks from direct contact with and incidental ingestion of chemicals of concern (COCs) in sediments in the Site to acceptable levels.
2. Reduce COC concentrations in sediments in the Site to levels that will result in acceptable risks to humans that eat fish and shellfish from the Site.
3. Reduce human health risks from direct contact with and incidental ingestion of COCs in water in the Site to acceptable levels.
4. Reduce ecological risks from contact with and ingestion of COCs in sediments or prey in the Site to acceptable levels.
5. Reduce ecological risks from contact with and ingestion of COCs in water in the Site to acceptable levels.

It is anticipated that these preliminary RAOs will be refined throughout the data collection and evaluation phases of the project; however, the preliminary RAOs are considered sufficient to identify the needed data types for Round 2 sampling. Round 3 data types will also be developed using these RAOs and the results of the Round 2 sampling effort. The categories of data that will be required to complete the RI/FS include sediment and tissue chemistry, sediment toxicity data, physical sediment characteristics, surface water chemistry and conventional parameters, habitat type and distribution, species occurrence, , hydrodynamic/sediment transport processes, sources (including upland and outside of the ISA), and source control status.

6.2 OBJECTIVES OF THE RI/FS

The Site is complex and includes multiple potentially responsible parties (PRPs), potential ongoing sources both upstream and within the ISA, potential locations that could become early remedial actions implemented as non-time critical removal actions under their own AOCs (i.e., Early Actions), and an existing PRP group (the LWG) that is funding the RI/FS required by the current AOC. As a result, the ROD must anticipate how a remedial action can be determined and implemented given all of the complexities associated with the Site.

Sources of contamination to Portland Harbor may contribute localized areas of risk exceeding acceptable levels. Sources include stormwater discharges, groundwater discharges, atmospheric deposition, and non-point source runoff. If it is determined that these sources contribute to unacceptable risk to the site, a combination of upland source control measures and/or in-water remediation measures may be required. The RI/FS must gather sufficient data for the human health and ecological risk assessments to evaluate the risks associated with the release, discharge, or emission of these sources to Portland Harbor.

Consistent with EPA's memorandum, Principles for Managing Contaminated Sediment Risks at Hazardous Waste Sites [OSWER Directive 9285.6-08 (EPA 2002b)], a risk-based framework for characterizing the Site, evaluating options for sediment remediation, and developing the ROD forms the basis of this Work Plan.

First of all, it is important to note that the RI will not be considered complete until:

1. Potential sources have been identified,
2. The nature and distribution of chemical constituents (vertical and lateral) that pose risk is defined for both river-wide and localized areas of contamination, and
3. River dynamics and contaminant transport are understood in sufficient detail to evaluate sediment stability and potential impacts associated with individual sites and their contribution to Portland Harbor.

Based on information collected to understand the distribution of chemical constituents, risk assessments and evaluations will provide important input to the ROD. The baseline ecological and human health risk assessments will estimate risks to ecological receptors and human health. The results of the baseline risk assessments will be used to identify and delineate preliminary SMAs in which sediments may present unacceptable risks. (Section 8.6 describes how SMAs will be delineated in more detail.) After preliminary SMAs are identified, the FS will develop a list of potential remedial alternatives. The evaluation of remedial alternatives may include an evaluation of relative risks associated with each alternative. The overall risk-based approach to the RI/FS is summarized in Figure 6-1.

According to the National Contingency Plan, the overall goal of the RI/FS process is protection of human health and the environment from adverse effects of hazardous substances. Risk assessment plays a central role in the site characterization and potential cleanup associated with any RI/FS project. The purpose of a risk assessment is to characterize the risks posed by hazardous substances. This information is required to make risk management decisions related to the Site. The results of the risk assessment are then used to evaluate remedial alternatives and to establish cleanup goals, as appropriate.

In accordance with EPA guidance (1988, 1997, 2002b), the RI/FS for the Portland Harbor Superfund Site will be an iterative process using a risk-based framework for determining risk to human health and the environment from site-related chemicals and for evaluating options for risk reduction from exposure to chemicals in sediment. Interim risk evaluations will be used to focus the remedial investigation. These interim risk evaluations will be based on conservative exposure assumptions and will consider all relevant RI/FS data to understand if (and under what conditions) receptors may be exposed to contaminated subsurface sediment above acceptable risk-based levels.

At the end of the RI/FS, available data must be adequate to allow EPA to make risk management decisions for the Site. Multiple iterations of sampling and analyses are anticipated to allow sufficient characterization of risks to support risk management decisions for the Site. Sampling for each iteration will be determined, in part, based on interim risk evaluations and will be documented in subsequent field sampling plans. Interim risk evaluations will be used to identify additional data needs for the risk assessment, which will be incorporated into the Work Plan and subsequent field sampling plans. These interim risk evaluations will also be used to provide a more complete understanding of exposure pathways and the magnitude of potential exposure and to update the conceptual site model. Additional data collection will be focused on data needed to reduce uncertainties associated with preliminary estimates of risk. Additional data collection may also be required to address data needs identified in subsequent technical memoranda, data gaps identified during sampling rounds 2A and 2B and/or new information relevant to the RI/FS. Exposure estimates per medium will be derived following adequate characterization of that particular medium. The final HHRA and ERA reports will be included in the final RI report.

Once the site has been adequately characterized relative to the nature and distribution of chemical constituents, the media, pathways, and chemicals driving unacceptable risk will be identified in the baseline risk assessment. Prior to development of remedial goals and strategies, an evaluation of potential sources of chemicals driving unacceptable risks will be conducted. Chemicals may be entering the ISA from sources located within the ISA or upstream of the ISA, and some chemicals may be contributed from both ISA and upstream sources. Background levels will be established in accordance with EPA (2002c) and other relevant guidance and will be used in the overall remedial decision-making for the Site. The approach that will be

used to establish background levels will be submitted as a technical memorandum to EPA for review. Consideration of background conditions will follow EPA guidance (2002c) as well as other relevant EPA Superfund guidance and regulatory and statutory requirements.

After the evaluation of sources is completed, development of site-specific preliminary remediation goals (PRGs) will occur. PRGs will be developed for those chemicals driving unacceptable risks and having sources within the ISA. PRGs will be used in the delineation of potential remediation areas and will be developed for both ecological and human receptors. The methods and assumptions that will be used to derive the PRGs for both ecological and human health endpoints will be submitted as a technical memorandum to EPA prior to submittal of the baseline risk assessment.

Direct and indirect pathways from sediment will likely be the primary drivers of ecological risks at the Site. Based on the benthic risk approach, sediment PRGs will be derived directly from the predictive effects model and, if possible, the crayfish-to-sediment regression relationship. As a tool for developing sediment PRGs for fish, an approach to estimate the relationship between COI concentrations in sediment and associated tissue will be developed in collaboration with EPA and its partners. A technical memorandum will be submitted to EPA describing the modeling approach to be used for developing PRGs. The possible approaches range from deriving site-specific biota sediment accumulation factors (BSAFs) to adapting a generic aquatic food web model. The model will be calibrated using site-specific data for those parameters that are highly variable between aquatic systems and/or contribute significantly to the output. Literature-derived values will be used to parameterize the model, when necessary. Wildlife PRGs will be based on probable risk levels, using site-specific assumptions regarding wildlife exposure.

For human health, fish consumption will likely be one of the primary risk drivers at the Site. Similar to the approach for ecological risks, a model will be used to develop sediment PRGs based on fish tissue concentrations that result in unacceptable risks to human health. The same model selected to develop the sediment PRGs for the ecological risks will be used to develop sediment PRGs for human health risks resulting from fish consumption. Sediment PRGs will be developed for each of the fish or shellfish species that pose unacceptable risks for human consumption. If needed, sediment PRGs will also be back-calculated for beach areas where direct contact with sediment results in unacceptable risks to human health.

To examine spatial distributions of risk, map layers will be created for each ecological and human health endpoint, depicting areas with sediment concentrations that pose unacceptable risks. Areas of unacceptable risk will be defined using calculated sediment PRGs. The maps will be based on available sediment data of acceptable quality. The maps for each ecological endpoint will be overlaid to define preliminary areas for potential remediation for the purpose of protecting ecological receptors. The maps for target fish and shellfish species for human consumption also

will be overlaid to define preliminary areas for potential remediation for protection of human receptors.

The ecological risk-based PRGs and map overlays will be combined with the human health-based PRGs and map overlays to examine differences and similarities in spatial distribution of areas that pose unacceptable risks to ecological and human receptors. Where overlap exists, the lowest PRG will be identified as the target concentration. The areas resulting in unacceptable risks will be identified as preliminary areas of concern to be evaluated in the FS.

This information on sediments will be combined with identified risks from other media, including groundwater present in sediments (or Transition Zone water) and surface water. Risk based-PRGs will also be developed for these media and will be displayed in mapping approaches, as appropriate.

The RI/FS will develop the information to support the following elements for EPA's consideration in developing the proposed plan and ROD:

1. **Sediment Management Areas.** It is recommended that the ROD delineate SMAs based on unacceptable risk to human health or the environment. The delineation will include an estimate of the areal extent based on unacceptable risk. Volumes of sediment with unacceptable risk will also be determined, where appropriate (see below for more detail). The boundaries of the required remediation areas will be refined following the ROD as additional data are collected by responsible parties in the RD/RA phase of work. The process for determining site-specific risk will follow the same rules and processes used in the site-wide risk assessment. It should be noted that contaminated sediments may present area- or site-wide risks that will also be addressed in the FS. It is anticipated that some unacceptable risks determined by the risk assessments will be restricted to generally well-defined sources and areas of relatively high contaminant concentrations (and associated risk), and will be defined as SMAs. It is also anticipated that unacceptable risks will exist over more widespread areas (e.g., chemicals contributing to bioaccumulation risks) and the contribution of each SMA to these site-wide risks will be recognized and described for each SMA.
2. **Early Actions and Operable Units.** It is recommended that the ROD provide the regulatory mechanism to acknowledge and account for the environmental benefit of any Early Actions that have been implemented earlier or that have been approved by EPA at the time of the ROD. Some areas within the Site might be suited for designation as separate operable units where subsequently distinct RD/RA and related tasks would be completed for the particular unit(s).
3. **Remediation Recommendations.** It is recommended that the ROD identify the type of remediation by SMA, according to the conclusions of the FS. For some SMAs, this will likely lead to a suite of remedies that includes dredging,

capping, natural recovery, and institutional controls that are applied in combination across the SMA.

4. **Disposal Options.** For those areas targeted for dredging in the remediation recommendations described above, it is recommended that the ROD identify a menu of viable sediment disposal options and locations. Because the dredging actions may occur over a broad period of time and the volumes will likely vary substantially by SMA, it is advantageous identify a variety of disposal options. To the extent that these options include yet-to-be-constructed or permitted facilities, such as in-water confined aquatic disposal or nearshore disposal facilities, the ROD will rely on the analyses presented in the FS report to substantiate the acceptance of each disposal option. For existing privately or publicly operated landfills, the ROD will rely on a combination of the existing regulatory mechanisms that those facilities have for accepting contaminated dredged material as well as the analyses presented in the FS report.
5. **Sources of Recontamination (Upstream of the Site and Within the Site).** It is recommended that the ROD identify potential sources that are contributing to unacceptable risk. These sources may include inputs from upstream of the Site, within the Site, or in upland areas that may be sources of recontamination of remedies proposed for the Site. Sources of risk within the Site will be identified, and decisions regarding cleanup in the ROD will take into account any necessary source control actions to ensure long-term effectiveness of the remedy.
6. **Integration of ROD with NRDA.** To create efficiencies between the CERCLA and the National Resource Damage Assessment (NRDA) processes, it is recommended that the ROD be integrated with the NRDA, to the extent practicable.

In addition to the above objectives, the LWG believes the RI/FS process and resulting ROD will need to provide practical solutions to cleanup while considering other regulatory efforts and a multiuse harbor. Therefore, the LWG has the following general objectives for remedial actions:

1. Promote remedial actions that do not limit current or planned waterway, municipal, commercial, industrial, recreational, or tribal ceremonial uses.
2. Promote remedial actions that are feasible for the physical system of the river.
3. Integrate remedial actions with NRDA findings and restoration plans.

6.3 GENERAL INVESTIGATION APPROACHES

This section defines how the proposed RI work will specifically address selected project issues raised by EPA.

6.3.1 Determine Scope of RI/FS Upstream and Downstream Sampling

EPA and the LWG will work cooperatively to determine the data and analyses needed upstream and downstream of the ISA for EPA to determine site boundaries. A technical memorandum will be submitted that describes the general approach to this issue. This memorandum will be combined with the background approach technical memorandum, described in Section 6.3.2.

6.3.2 Define Background Conditions

Background conditions are typically evaluated to make appropriate risk management decisions, and will be considered in the FS. Evaluation of background conditions will be performed in conjunction with EPA and EPA guidance on this subject (EPA 2002c) and other relevant EPA Superfund guidance. Site-specific background conditions for various data types (e.g., sediment chemistry, fish tissue, sediment toxicity, surface water chemistry) will be identified in the technical memorandum, Approach to Determining Background for the Portland Harbor Superfund Site / Process for Delineating Upstream and Downstream Extent of Contamination. This technical memorandum will describe the definition and approach for determining background levels for the Site. This information will be used, following the risk characterization in the risk assessment, as a risk management tool, consistent with EPA guidelines (EPA 2002c).and. This memorandum will also describe the process for delineating the extent of contamination upstream and downstream of the ISA.

6.3.3 Delineate “Hot Spots”

The overall sampling approach for delineating “hot spots” or principal threat areas involves focusing surface and subsurface sediment sampling in areas where known sources are present and in areas where existing sediment chemistry data indicate elevated concentrations of COIs occur. Round 1 and historical sediment chemistry data will be compared to appropriate sediment screening values for “hot spots,” identified in collaboration with EPA and its partners, to identify locations with potentially “high” risk. Additional sediment samples will be placed to better define the extent of the identified areas. The data evaluation process will be repeated with Round 2 sampling results to determine whether new areas can be classified as “hot spots.” Additional sampling will be conducted, as necessary, in Round 3 to delineate any “hot spot” areas identified in Round 2.

6.3.4 Define Sediment Management Areas

As discussed in detail in Section 8.6, results from sediment sampling conducted to define the nature and extent of chemical constituents will be combined with baseline risk assessment results, physical environmental data, physical modeling results, habitat data, river and land use data, and source information to define SMAs.

6.3.5 Identify Additional Sources

Existing historical upland information has been reviewed and evaluated to identify suspected historic and ongoing sources; this evaluation will be documented in the updated CSM report. Sediment samples will be located in those areas where existing sediment chemistry data are sparse and historic upland data indicate pathways from suspect sources most likely to impact the river. Sediment transport modeling results and other physical river system data and source information will be used to help locate sediment samples in those areas where sources are expected to impact the river. Also, a limited number of sediment samples will be placed in previously uncharacterized areas that are not associated with any known ongoing or historic sources to reduce uncertainty related to the potential occurrence of impacted sediments from unrecognized or transient historic sources. Each time sediment data are analyzed, the distributions of chemicals will be evaluated to ascertain whether other unrecognized sources may be or may have been present.

6.4 MAJOR PHASES OF WORK

The major tasks of the RI/FS are briefly described below. As noted previously, the intent of this section is to provide an overview of the major milestones to complete the RI/FS, how those milestones relate to each other, and how they fit into overall data collection, evaluation, and RI/FS needs. For clarity, many important smaller tasks are not reflected in this overview, but are discussed in Sections 7 and 8, and Appendices A, B, and C.

6.4.1 Pre-AOC Tasks

Prior to execution of the AOC, a stipulated agreement was signed by the LWG (EPA 2001b) to conduct some significant and time-critical data collection tasks. It was agreed that this information would be necessary for the RI and could be collected prior to Work Plan development. The four tasks listed below were completed under the stipulated agreement:

1. Sediment profile imaging
2. Multibeam bathymetry – high water
3. Juvenile salmonid residence time
4. Integrated evaluation of historical navigation channel bathymetry and a sediment trend analysis.

Of these four tasks, the first three involved fieldwork undertaken by the LWG. The fourth task involved analysis of two pre-existing data sets. Another field effort not included in the stipulated agreement was conducted by the LWG in spring 2002 and involved the collection of water current profiles at 10 transects across the Portland Harbor during a high-flow event (see Section 2.2.3).

These tasks provide fundamental information that is useful in various future RI/FS tasks. In general, they are useful in developing and refining the CSM from physical as well as biological perspectives (see Section 5). An accurate CSM helps define future rounds of sampling and frames needed risk assessment work.

6.4.2 Round 1 Work

Round 1 sampling was conducted in the summer and fall of 2002, and included data collection for clearly apparent needs or exploratory data collection and surveys used to more completely identify future data needs. In addition, the data collection efforts were seasonally dependent tasks, and the LWG did not want to wait another year to initiate them. The LWG prepared a Round 1A FSP (SEA et al. 2002b) for these initial tasks. Round 1A sampling work, approved by EPA in May 2002, included the following activities:

- Collection of fish and shellfish tissue for chemical analysis
- Evaluation of epibenthic colonization using multiplates
- Reconnaissance survey of plants and amphibians
- Reconnaissance survey of adult lamprey
- Measurement of riverbank erosion and accretion using sediment stakes
- Multibeam bathymetry – low water.

A pilot mark/recapture study of juvenile salmonids was also authorized as an additional Round 1A task, but was not completed because the water temperatures were too high by the time the task was authorized, which would have caused unacceptable stress on the fish. Additional sample collection tasks for 2002 were proposed in the Round 1 FSP submitted to EPA in June 2002 (SEA et al. 2002c). A subset of these tasks was approved by EPA in September 2002:

- Beach sediment chemistry
- Reconnaissance-level benthic infauna community analysis
- Collocated sediment chemistry at sculpin, crayfish, and benthic infauna stations.

The LWG also undertook a reconnaissance survey of juvenile lamprey and benthic infauna for potential tissue analysis in September 2002.

Results of each of these sampling tasks will be submitted to EPA either as stand-alone data reports or as part of the Round 1 site characterization summary report that will be provided to EPA within 120 days following completion of Round 1 sampling and analysis.

The data collected in Round 1 meet various RI/FS data needs, including:

- **Fish and Shellfish Tissue and Sediment Chemistry.**
Provides critical information for both ecological and human health risk pathways that had little or no pre-existing information. This allows direct measurement of site-specific concentrations to which wildlife and humans may be exposed via fish and shellfish consumption.
- **Multiplates, Reconnaissance Surveys, Benthic Infauna.**
Provides information to identify ecological and human health exposure pathways and receptors likely to be present at the Site. This information assists the CSM development and determination of significant pathways and receptors included in the risk assessments.
- **Sediment Stakes and Bathymetry.** Provides time-series data on riverbed changes. These data assist the development of the physical CSM and selection of sampling locations and methods related to issues such as sediment and chemical stability, sedimentation/scour areas, and surface layer depth determination. These data also supplement the STA[®], SPI, bathymetric, and other physical system data described in Section 2.

These data will be used in the ecological preliminary risk evaluation report and in both the baseline risk assessment and RI reports. The ecological preliminary risk evaluation report will evaluate and interpret the historic (Category 1), pre-AOC, and Round 1 data (see Section 6.4.3).

In addition to field data collection, existing information is being reviewed during the Round 1 period for the purpose of updating the CSM. Specifically, existing upland site information is being evaluated for potential sources and source-related data as well as data on potential past and/or current pathways to sediment, surface water, and Transition Zone water, from groundwater, storm and wastewater discharges, erosion, and over-water activities.

This information will be used to help categorize potential upland sources of COIs based on the extent to which they have been characterized, their regulatory status, and their potential for affecting sediments or river water. Known or suspected sources will be characterized as:

- Historical, ongoing, or controlled
- Identified and need no further source characterization
- Identified and require further source characterization.

In addition, this process will help identify areas of the river where reviews of historical information indicate the probability of COI sources, but existing information is insufficient to confirm the absence or presence of a source. The information from this review will be evaluated in the context of potential impacts to water and sediments in the river and will be incorporated into updates to the physical and chemical aspects of the CSM presented in this Work Plan.

The results of the information review also will be provided to DEQ so that further upland source identification, characterization, or source control work can be implemented by upland facilities on a site-specific basis.

6.4.3 Additional Project Scoping Activities

Several technical memoranda will be developed to complete project scoping activities that have not been fully documented in this Work Plan, including: 1) Process to Identify COPCs, 2) Derivation of PRGs, and 3) Ecological and Human Health Groundwater Pathways Assessment/Groundwater Sampling Approach. The contents of these technical memoranda are described in Table 6-1:

Technical memoranda also will be completed specifically in support of the ecological risk assessment to more clearly define the scope and methods for ecological risk assessment activities: 1) toxicity reference value (TRV) selection, 2) benthic assessment interpretive approach, 3) comprehensive ERA approach, and 4) food web model. The contents of each technical memorandum also are described in Table 6-1.

An ecological preliminary risk evaluation (PRE) report will be prepared and submitted to EPA and its partners after EPA approval of the TRV technical memorandum. The PRE will include a risk characterization based on historical, pre-AOC, and Round 1 data for benthic invertebrates using the tissue-residue approach, fish, and wildlife. Results will be used, in part, to help identify COPCs related to contaminant concentrations in fish and invertebrate tissue. This applies primarily to risks to aquatic-feeding wildlife that consume fish or invertebrates from the river, and risks to invertebrates and fish containing the compounds. This COPC identification is narrowly focused because sediment data from Round 2 are needed to identify a comprehensive list of COPCs. The PRE will not rely on the benthic assessment technical memorandum, which addresses the analysis framework for the sediment toxicity data to be collected during Round 2. The preliminary risk estimates and the associated uncertainty will help to identify ERA data and information gaps that may be filled during subsequent investigations/evaluations prior to the baseline ERA.

6.4.4 Round 2 Work

Round 2 sampling is intended to gather the majority of the remaining data for the RI and risk assessments as well as initiate the collection of data for the FS. Once Round

2 data are collected, they will be combined with Round 1, pre-AOC, and historic (Category 1) data in a comprehensive site characterization summary to evaluate data gaps and the need for additional sampling efforts. The majority of FS data collection will occur in Round 3. Round 2 is described in more detail in Section 7. It is anticipated that Round 2 will require multiple field efforts. This multiple effort is necessary so that EPA and the LWG have sufficient time to review and agree upon appropriate sampling methods and locations for each type of sampling, and because information needed to develop sampling plans will become available throughout Round 2. For each sampling effort, the procedures will be described in an FSP and approved by EPA prior to initiating that sampling work.

The following data types will be collected during Round 2:

- **Surface Sediment Chemistry.** These data will support the ERA and characterize contaminant distribution and source effects to the river.
- **Sediment Bioassays.** These data will support the assessment of benthic risks for the ERA.
- **Beach Sediment Chemistry.** These data will support the HHRA beach exposure scenario, if needed, based on evaluation of Round 1 results.
- **Surface Water Chemistry.** These data will evaluate potential effects of sources on the river system and support the HHRA and ERA.
- **Physical System.** These additional data, including bathymetry and sediment stake measurements, will be used to define SMAs.
- **Groundwater Impacts from Upland Sources.** Data will be collected to evaluate the impact to sediments and environmental receptors from groundwater chemicals discharging from upland areas to the river
- **Natural Attenuation as a Potential Remedial Alternative.** Limited data will be collected to assess the general feasibility of natural attenuation as a potential remedial alternative, including data collection for natural attenuation model calibration, parameterization, and verification
- **Hydrodynamic/Sedimentation Model.** These data will be used to calibrate, parameterize, and verify models used in the RI.

General types of samples that will be used to evaluate impacts to sediments and environmental receptors from COIs discharging from groundwater include bulk sediment samples and bioassays, Transition Zone water quality samples, groundwater gradient and flux measurements, and surface water (including seep) samples. These types of samples are discussed in more detail in Section 7.

In particular, subsurface sediment sampling will be performed to:

- Define the nature and extent of contaminant releases

- Verify assumptions regarding subsurface stratigraphy used for developing the hydrodynamic model
- Validate the site conceptual model
- Evaluate sediment quality in areas where the hydrodynamic model or bathymetric change assessment indicates sediment scour may occur
- Evaluate sediment quality in areas where potential prop wash, boat wakes, or wind waves may result in erosion of surface sediments and expose underlying sediments
- Evaluate potential dredging or shoreline development areas.

These data collection efforts will provide the basic information needed to refine and validate the CSM, answer questions about the physical system, and identify source effects to the river and the distribution of chemical constituents that may pose unacceptable risks to ecological receptors and human health. Refinement of the CSM will be conducted through examination of data collected during Rounds 1 and 2 to understand the links between chemicals found in various matrices (water, sediments, tissues), the link between sources and chemicals in various matrices, the relationship between physical stability issues and chemical distributions, as well as the relationship between all these parameters and pathways/receptors defined in the preliminary CSM. Where new data indicate the conceptual model was in error or incomplete, the CSM will be revised accordingly. Where new data indicate potential gaps in the understanding of the CSM, additional data collection to fill these data gaps and better define the CSM will be proposed for Round 3 work.

The process for selecting subsurface chemistry sampling locations will be based on information collected in previous rounds or efforts. However, hydrodynamic modeling is an additional task that will be conducted during the course of Round 2 to better understand the physical system of the river. The modeling approach and objectives are detailed in a modeling technical memorandum (West Consultants 2004). This modeling will be confined to understanding river water flows, currents, and resulting sediment transport patterns (e.g., where surface and subsurface sediments are stable over time versus where they are unstable or likely to move or be exposed over time). This model is not intended to predict chemical fate and transport.

Finally, some additional FS-related data evaluations are proposed during Round 2, including a literature review of potential treatment methods and a disposal facility siting evaluation. Conducting these evaluations during Round 2 will allow treatment and disposal alternatives to be considered without delay of the FS process (see Section 6.4.9).

Along with previous rounds of sampling data, the Round 2 information will input directly into the baseline risk assessments discussed in Section 6.4.7.

Based on the results of Round 2 sampling, two reports will be completed in support of the ecological baseline risk assessment: 1) results and interpretation of Round 2 benthic assessment, and 2) food web modeling results. The report on the Round 2 benthic assessment will use the results of Round 2 sediment bioassays to develop and apply a predictive relationship model between chemical concentrations in the sediment and bioassay responses, and confirm toxicity in high priority areas. The food web modeling results report will use data collected in Round 1 and selected results from Round 2 to help develop sediment cleanup goals.

6.4.5 Round 3 Work

The primary purpose of Round 3 work is to gather data for the evaluation of FS alternatives. This work may include collecting some sediment or related data to better define SMAs (and any related principal threat areas). However, in many cases refinement of SMAs may be conducted as part of the RD/RA phase after the ROD. In addition, if there are substantial data gaps identified in the preliminary risk assessments, these may also be filled in some cases during Round 3. As with Round 2, Round 3 may be adapted to one or more sampling efforts, each with an approved FSP, as project developments warrant.

The following data will be collected during Round 3:

- **Surface and Subsurface Sediment Chemistry.** These data will be collected to further refine SMAs and volumes if needed to complete the FS. (In some cases, this information may not be needed to complete the FS, and some areas may be appropriately refined during the RD/RA process that follows the ROD).
- **Surface and Subsurface Physical Characteristics.** These characteristics (e.g., consolidation potential, sheer stress, Atterberg limits, grain size, water content, specific gravity) will be ascertained relevant to potential remedial alternatives.
- **Natural Attenuation Sampling.** This sampling effort (e.g., radioisotope cores, sediment traps, water sampling) will be targeted for areas found in Round 2 to have potential processes that may support this alternative.
- **Potential Disposal Site Sampling.** Sampling at potential disposal sites will be performed, as necessary, to support evaluation of remedial alternatives.
- **Baseline Risk Assessment Data Gaps.** Data will be collected to fill substantial baseline risk assessment data gaps or uncertainties.

- **Uncertainty Analysis.** Data will be collected to fill substantial nature, extent, or source effect uncertainties.
- **Residual Risk Assessment.** Data will be collected to conduct residual risk assessments related to evaluation, comparison, and support of potential remedial alternatives.

These data will be used to prepare the RI and baseline risk assessments and develop the FS. The FS will use the refined SMAs to develop a list of potential remedial alternatives that could be applicable to each area.

6.4.6 Integration of Non-AOC Studies Data

Data from non-AOC studies being conducted in Portland Harbor over the course of the RI/FS will be reviewed for appropriateness following the methods described in Section 4.1.1 and will be incorporated into the project data set as the data become available. Several facility-specific, in-water sampling investigations are ongoing within the ISA. For example, the City of Portland is conducting sediment sampling investigations at its outfalls located in the ISA. Results of the City's outfalls investigations will be made available to the LWG for incorporation into the RI/FS.

6.4.7 Baseline Risk Assessments

At the end of Round 3, two baseline risk assessments will be conducted: one addressing ecological receptors and the other human health. These risk assessments will rely on the information collected through Round 3 and will be presented in the risk assessment reports that will be issued along with the RI report (see Section 6.4.8). The approaches used to conduct these risk assessments are described in more detail in Appendices B and C.

Ecological

The baseline ERA is being designed and performed consistent with EPA (1997, 1998) guidance. ERAs are typically conducted in an iterative or "tiered" manner that increasingly focuses on those exposure scenarios that are the greatest contributors of risk. The risk assessment is complete when the risk managers have enough confidence in the results to make a decision they can scientifically defend (EPA 1998). A tiered process is advantageous because it typically results in refined lists of pathways and receptors that will require application of risk reduction measures. Consistent with this tiered process, the ecological preliminary risk evaluation report will help identify data and information gaps to be filled for a more complete baseline risk assessment.

For both the preliminary ecological risk evaluation and the baseline ERA, the following steps will be completed, consistent with regulatory guidance:

- Describe the results of the problem formulation, including any updates to the CSM.
- Conduct an analysis, including characterization of exposure, characterization of effects, and identification of ecosystem and receptor characteristics.
- Complete the risk characterization, including an estimation of risk, a description of risk, and an evaluation of the uncertainties.
- Communicate the final product to managers and interested parties for risk management decisions.

The risk assessment procedures for each step in this process are detailed in Appendix B.

Human Health

The baseline HHRA will be conducted following Round 3 and will be based on EPA (1989, 1998) guidance. Prior to submittal of the baseline HHRA, a series of interim deliverables will be produced as data become available, these deliverables are described in Table 6-1. Data available at the time of the baseline HHRA will be used to estimate potential human health risks associated with the Site.

Consistent with guidance from EPA (1989) and DEQ (2000c), the baseline HHRA will incorporate the following steps:

- Prepare an analysis plan to identify data needed to adequately assess risks to human health in accordance with state and federal guidance.
- Develop an exposure assessment, which estimates the magnitude and frequency of potential human exposures and the pathways by which humans may be exposed.
- Develop a toxicity assessment, which estimates the probability of adverse health effects that may occur as a result of exposure to a chemical.
- Develop a risk characterization, which estimates the potential for adverse health effects to occur and evaluates the uncertainties associated with the risk estimates.

Following collection of data in Round 3 of the RI, the baseline HHRA will be completed. The results of the HHRA will be used to establish risk-based concentrations that will be protective of human receptors at the Site and to provide input to risk management decisions that address remedial action objectives for the Site. The risk assessment procedures for the HHRA are presented in Section 7 and Appendix C.

6.4.8 Site Characterization Reporting

Validated analytical data will be provided to EPA within 90 days of each sampling activity (e.g., Round 2 surface sediment sampling, Round 2A sediment coring, Round 2B sediment coring, sediment beach sampling, surface water sampling, groundwater pathways sampling). Data will be provided in electronic format showing locations, media, and results. As specified in the AOC, and upon request, analytical data will be made available to EPA within 60 days of each sampling activity.

The following site characterization deliverables will be prepared:

- Field sampling reports
- Site characterization summary reports
- Bioassay data report
- Comprehensive Round 2 site characterization summary and data gaps analysis report
- RI report
- Baseline risk assessment reports.

The contents of each deliverable are described in Table 6-1.

Round 2 and Round 3 information and data evaluations, described above, will be used in combination with Category 1, pre-AOC, and Round 1 data to complete the draft baseline risk assessments (see Section 6.4.7) and an RI report. The baseline risk assessments and RI will include:

- A characterization of the distribution of chemicals and sources that affect the river
- An assessment of ecological risk including risks to benthos, fish, wildlife, and other receptors of concern
- An assessment of human health risks from contact with sediment and water, and fish and shellfish ingestion
- A preliminary delineation of SMAs and sediment volumes that pose unacceptable risks
- A preliminary delineation of principal threat areas
- A preliminary understanding of the potential for natural attenuation as a remedial alternative.

This information will be necessary for the development of remedial alternatives for the FS. Nature, extent, and source characterization results and risk assessment results will be combined with the data and modeling of physical conditions within the river to define preliminary SMAs (i.e., areas that require some type of remedial action) and

volumes of sediments that pose unacceptable risks. The delineation of SMAs will consider issues such as:

- Risks for each receptor category (e.g., benthos, wildlife, human health)
- Estimated level of risks (e.g., higher risk areas like principal threats and lower risk areas)
- Types of physical environments relevant to changes in risk and remedial alternatives (e.g., erosive areas, natural attenuation processes, capping)
- Types of river uses that affect remedial alternatives (e.g., navigation channel, slips, docking areas)
- Areas that may be impacted by ongoing sources, upstream or in the ISA.

By integrating these issues, SMAs will define areas that can be used to develop remedial alternatives for the FS. Sediment management areas with relatively high risks will be evaluated for their potential as principal threats. The delineation of SMAs, including areas of “higher” and “lower” risk, is described in more detail in Section 8.6

Following the risk assessment, potential upland and upstream sources will be evaluated for those pathways and COPCs driving risk. Where this information indicates that unacceptable risks may be caused by these ongoing sources, additional source identification and control activities may be warranted.

In the case of potential ongoing upland sources within the ISA, this information will be provided to DEQ so that further upland source identification, characterization, and/or control work can be implemented on a site-specific basis. Given that there is an ongoing DEQ-led effort to identify ongoing sources along the ISA, the LWG does not see the need for extensive independent evaluations of groundwater sources through this RI/FS. However, the LWG will evaluate the in-water impacts of contaminants in groundwater discharging to the river where information gathered by the LWG, DEQ, or other parties indicates the potential for this to occur. The process for focusing the evaluation of potential impacts to sediment, Transition Zone water, and surface water from chemicals in groundwater discharging to the river will be proposed and negotiated with EPA prior to implementation.

Information collected by LWG regarding substantial upstream sources that may influence the risk estimate will be referred to EPA. It is anticipated that EPA review of this information could result in several potential approaches by EPA to identify and control upstream sources, including:

- Identification by EPA of PRPs related to these sources and initiation of site-specific source control efforts through DEQ or EPA-led enforcement with those PRPs
- Identification of another upstream Superfund site or operable units with an appropriate group of new PRPs relevant to that area
- Expansion of the existing Superfund site
- Control of upstream sources by EPA, DEQ, or other agencies through other applicable regulatory mechanisms such as the Clean Water Act, TMDL studies, watershed planning efforts, and NPDES permits.

The information on sources will also be used to assess the potential for recontamination under various remedial alternatives in the FS (see Section 6.4.9).

6.4.9 Feasibility Study Report

The primary purpose of the FS report is to determine appropriate remediation scenarios for sediments that have been shown to pose unacceptable risks through the baseline risk assessments and RI reports. The FS report is discussed in detail in Section 8 and Appendix A. FS-related deliverables are described in Table 6-1. In general, using the information developed from the four rounds of data collection, the FS steps include the following:

- Refine remedial action objectives defined early in the RI/FS process (Appendix A)
- Refine areas and volumes of sediments requiring remediation
- Finalize SMAs
- Develop a range of remedial alternatives that apply to the SMAs in various geographic and physical areas of the river
- Develop a list of remedial alternatives to be evaluated for each SMA
- Conduct a screening and detailed evaluation of those alternatives against the nine CERCLA evaluation criteria
- Conduct a comparative evaluation of those alternatives
- Recommend the most appropriate alternatives for each SMA.

The assessment of remedial alternatives may include evaluations to determine the relative risks posed by each alternative. Depending on the eventual content of the

baseline risk assessments, this may include reference to preliminary remedial goals such as sediment chemical concentrations.

In addition to the previous four rounds of data collection already described, several types of data evaluations that support the FS analysis will have been conducted during Round 3:

- Natural attenuation modeling based on Rounds 2 and 3 data collected specifically to assess the potential for natural attenuation
- Refinement, if warranted, of the hydrodynamic/sediment transport model based on Round 2 data inputs
- Recontamination modeling based on source information available through Round 3
- Literature survey to determine the need for treatability studies
- Treatability studies, if necessary, as determined by literature survey
- Disposal facility siting investigations (identifying potential candidate sites for the disposal of contaminated sediments).

These studies will be conducted prior to the actual start of the FS report to ensure that when Round 3 is complete the FS report can be initiated without delay or the need for further data collection or evaluations. Any Early Actions that are proceeding or have been completed under separate agreements with EPA will not be included in the FS report.

Substantial ongoing sources must be controlled before effective sediment remediation can take place. The effects of upland and upstream sources on river sediments and water in the ISA will be addressed by data collection and evaluation efforts (as described above). The FS report will include an assessment of the potential for recontamination for each remedial alternative given current conditions in the river as indicated by data from sampling rounds. This will determine whether effective remediation can proceed without delay given the level and extent of ongoing sources.

7.0 SITE CHARACTERIZATION APPROACH

This section describes the overall technical approach to data collection and analysis for the RI and risk assessments. The approach for the FS is presented in Section 8. Details of sampling and analysis are to be developed with the regulatory agencies based on approval of the framework presented herein, and documented in field sampling plans that will become attachments to this document. Some details of data analysis, such as that for the ecological and human health risk assessments, are presented in appendices and summarized in this section.

A significant amount of information, both quantitative and qualitative, exists for the ISA, yet additional data are needed to support the RI/FS. Historical quantitative data of sufficient quality to support the RI/FS were compiled in the project database and reviewed to identify specific data needs relative to the design of RI/FS field investigations and development of potential remedies. All data classified as Category 1 (see Section 4) were considered appropriate for use as part of the risk assessment process. Both Category 1 and Category 2 data were used for project scoping.

EPA's (2000a) DQO process was applied as part of the historical data evaluation to refine the specific data types needed to complete the RI/FS. The seven-step DQO process is designed to ensure that any data gaps, when filled, will meet the needs of the project. The seven-step DQO process documents the following:

1. Problems or issues that led to the investigation.
2. Decisions to be made or questions to be answered.
3. Inputs (i.e., types and source of data or information) to that decision.
4. Spatial and temporal boundaries of the project.
5. Decision rules or performance criteria used to evaluate the quality of the data and determine the outcome of the decision.
6. Tolerable error relative to the decision rule.
7. A sampling design and analysis plan that will collect the appropriate type and quality of data to meet the project objectives.

The LWG has applied the DQO process and identified a number of field programs needed to complete the RI/FS. The results of this process are described in the remainder of this Work Plan section, and the programs are summarized in Table 7-1. Note that the vast majority of data collected will be used to meet more than one objective of the RI/FS. Additional data needs beyond those shown in Table 7-1 may be identified later in the RI/FS through application of the DQO process.

Table 7-1 also shows the relationship between identified data gaps and the proposed sampling approach. Specific sampling locations will be provided in the Round 2 FSPs.

The following sections describe the issues, questions, decisions, data needs, and RI/FS tasks associated with each data type necessary to understand the physical attributes of the river system and determine chemical distributions, sources, risks and remedies for the ISA, consistent with OSWER Directive 9285.6-08 (EPA 2002b). Data needs that ensue from the DQO process form the basis of the RI/FS sampling program.

7.1 UNDERSTANDING THE PHYSICAL SYSTEM

The physical system of the ISA (e.g., hydrology, sediment movement) will be further investigated as a key element of the RI/FS because it influences the distribution of chemicals as they relate to ecological and human health risk, and finally, any remedial decisions for the Site. This section describes efforts conducted to date and those planned that are designed to gain an understanding of the ISA physical system sufficient to support site characterization efforts, ERA, HHRA, and the FS. A large amount of physical system data has already been collected and evaluated during pre-AOC and Round 1 efforts. A compilation of LWG physical system information is presented in Section 2, and a summary of the physical CSM is provided in Section 5.

The DQO process for understanding the river physical system is summarized in Table 7-2.

7.1.1 Problem Description

The LWR through the ISA is a large river with a complex flow regime and sediment movement patterns. The spatial and temporal scales of sediment movement must be understood at a level that allows accurate characterization of the distribution of chemical constituents, understanding of whether and how ongoing sources are manifested in sediment concentrations, accurate estimates of exposure concentrations for the risk assessments, and an understanding of how sediments move within the system. Hydrodynamic and sediment transport patterns must also be understood to develop and evaluate remedial alternatives for the Site.

7.1.2 Data Uses

Data from the river physical system investigations will be used in conjunction with other data (e.g., chemical distribution in sediment) to determine the following:

- The distribution and magnitude of shoaling and scouring in the ISA as measured directly from time-series bathymetric surveys in Round 1 and Round 2

- The pattern of shoaling and scouring areas in specific bank areas in the ISA as measured directly from sediment stake observations in Round 1 and Round 2
- Sediment movement patterns during major flood years and non-flood years as predicted by the hydrodynamic/sediment transport model.

7.1.3 Data Needs

A third bathymetric was conducted in May 2003 to extend the time series of observed riverbed changes. Also, following a relatively high flow event (about 140,000 cfs) in the LWR in February 2004, a fourth bathymetric survey, including current flow measurements, was performed. The time-series bathymetric change data will be used to calibrate/validate the hydrodynamic/sediment transport model that will be developed as part of the RI physical system investigations (Table 7-2). Low-water and high-flow data (ADCP) from within the ISA were also collected in May 2003 and February 2004, respectively, to support the modeling effort (West Consultants 2004). Surface sediment chemistry, both physical characteristics (e.g., grain-size) and chemical constituent levels, will be collected as part of the Round 2 site characterization program and compared with Round 1 and historic sediment data. These comparisons will be used to support the evaluation of riverbed changes observed or predicted by the physical investigations. Data on regional weather, sediment inflows, river stage, and flows are also needed for the model and are available on public web sites (e.g., USGS, USACE). These data will be compiled as part of the hydrodynamic modeling effort. Finally, additional data needs (e.g., site-specific critical erosion velocities, suspended sediment loads) may be identified during model development following Round 2 that are needed to refine or improve model accuracy. These data would be collected as part of Round 3.

7.1.4 RI/FS Tasks

Physical system investigations completed as part of pre-AOC RI/FS studies or during Round 1 include a compilation of previously existing information and the following efforts:

- Integration of the Sediment Trend Analysis (STA[®]) (GeoSea Consulting 2001) survey data from Portland Harbor (September 2000), with an evaluation of historical changes in navigation channel depths based on Corps hydrosurvey data
- Sediment-profile imaging survey of the LWR from RM 0 to 15.7 in December 2001 (SEA 2002f)
- Precision multibeam bathymetric surveys from RM 0 to 15.7 in winter 2001 and the summer of 2002 (DEA 2002a, 2003)

- ADCP current profiling during a high-river stage event on April 19, 2002
- Deployment and monitoring of sediment stakes.

The preliminary physical CSM model based on these surveys and data evaluations is provided in Section 5.

Physical investigations also have included a third bathymetric survey of the Portland Harbor and a short-term ADCP survey during a low-water/high-tidal influence period conducted in the spring of 2003 and a fourth bathymetric and ADCP survey during and immediately following a high flow event on the Lower Willamette in February 2004. The development, calibration, and validation of a hydrodynamic/sediment transport model of the LWR are planned in Round 2. If the hydrodynamic modeling process identifies other physical system data needs (e.g., site-specific erodibility measurements), these data will be collected late in Round 2 or in Round 3.

Hydrodynamic Modeling: The proposed modeling approach is fully detailed in the revised technical memorandum submitted to EPA in February 2004 (West Consultants 2004). As stated in the technical memo, the objectives of the modeling effort are to:

- Determine the spatial and temporal sediment transport patterns so that surface contaminant distributions and risks to ecological and human receptors in the Lower Willamette River can be adequately characterized.
- Determine whether physical processes expose previously buried contaminated sediment, including during major flood events.
- Determine whether physical processes result in burial of contaminated sediment.
- Quantify the rates and locations of sediment accretion and erosion associated with various flows, including extreme events.

The model is designed to provide both an assessment of more short-term or “typical” sediment transport regimes in the river and estimates of flow velocities and sediment transport under rare high-flow events. Along with grain size, bathymetry, sediment stake, and flow data, the modeling will help identify sediment transport regimes within the river, such as depositional, erosional, and transitional areas. This information will be valuable in understanding the existing distribution of chemicals, as well as potential source transport, recontamination, and natural attenuation issues. The modeling of high flow events will identify potential scour areas that might expose subsurface contaminated sediments in extreme high flows and will predict design parameters, such as bed velocities, that are required to evaluate remedial alternatives (e.g., capping or confined aquatic disposal).

Pending approval by EPA of the proposed modeling approach in early 2004, the initial modeling effort will be completed in the summer/fall of 2004. Sediment and other data collected in 2004 will be used to refine the model in 2005. As warranted, the model results will be used to focus Round 3 data collections, e.g., indicating a need for additional subsurface sediment data in an unstable area. Also, any data gaps identified by the modelers as critical to model performance will be targeted for collection as part of Round 3. Table 7-2 provides additional details on how the modeling effort fits into the physical system investigations and how model output will be used to support the RI/FS.

7.2 UNDERSTANDING CHEMICAL DISTRIBUTIONS AND SOURCES

As part of a comprehensive CSM, it is critical to identify potential sources and the distribution of chemicals resulting from those sources. In the ISA, the sediment itself may act as a source. There may also be surface water and groundwater inputs to the system, in addition to the other sources presented in Sections 3 and 5. These potential sources and the process for understanding the distribution of chemicals related to these sources are discussed below.

To understand the distributions of chemicals, a list of chemicals was developed for the Round 1 sampling program based on historic data, current and historic activities, and laboratory reporting capabilities. The initial list of chemicals, which is included in the EPA-approved Round 1 QAPP (SEA 2002e), may be revised in later rounds of investigation (e.g., following EPA approval of the Round 2 QAPP). The process that will be used to limit chemicals from future investigations through identification of COPCs will be submitted to EPA as a technical memorandum.

7.2.1 Sediment

Sediment samples will be collected to identify potential sources, understand the distribution of chemicals resulting in potentially unacceptable ecological and human health risks (described in Sections 7.3 and 7.4), and to evaluate natural attenuation for the FS (described in Section 8). A systematic and iterative approach will be used, as described below, for implementation of sediment sampling events. This approach will allow identification of any significant new sediment sources and characterization of the nature and extent of sediment contamination associated with existing sources, as needed for risk and remedial alternative evaluations.

The DQO process for understanding chemical distributions in sediments and sources is summarized in Table 7-3.

Problem Description

Although there is a considerable amount of historical sediment data for Portland Harbor, additional data are needed to generally describe areas that pose unacceptable

risk (i.e., SMAs). Additionally, surface and subsurface sediments may act as sources to other parts of the Portland Harbor.

Data Uses

Data from the sediment investigation will be used in conjunction with Category 1 historical data to:

- Characterize the distribution of chemical constituents in surface sediments in potential exposure areas
- Characterize the distribution of chemical constituents in subsurface sediments that have the potential to act as sources or that are located in potential remediation or navigation/maintenance dredge areas
- Characterize the potential inputs from upland sources to the ISA
- Complete the baseline risk assessments
- Complete the FS.

Data Needs

Sediment chemistry data are needed for chemicals and conventional parameters listed in the QAPP. Sampling and analytical methods will be adequate to achieve analytical concentration goals listed in the QAPP, when feasible (i.e., analytical concentration goals, which are developed based on risk screening, may be below the concentrations that can be achieved using available analytical instrumentation, especially in samples with matrix interferences). Surface sediment data are required to understand the distribution of chemicals resulting in potentially unacceptable risk; subsurface sediment data are required in areas where subsurface chemicals may act as potential sources including near some historic sources, in navigation/maintenance dredge areas, and in berthing site areas that may scour. Finally, subsurface data will be used in the FS to assess sediment volumes in SMAs requiring cleanup.

RI/FS Tasks

Phasing of Sediment Investigations

The generation of sediment data to support the RI/FS will follow an iterative process. Sediment sampling was conducted in Round 1 and will be conducted in Rounds 2 and 3 of the RI/FS. Composite samples were collected in Round 1 at numerous beaches to evaluate potential human health risks to beach users. To support the ERA, additional Round 1 sediment samples were collected at selected locations where sculpin, crayfish, clams, and other benthic infauna were found, and in selected potential wildlife exposure areas. Clams and other benthic infauna were not collected at most stations in Round 1 because they were not found in these locations at

sufficient volumes for the entire list of analytes. More tissue and/or sediment may be needed based on the results of the preliminary ecological risk evaluation.

Round 2 sampling is envisioned to include multiple sampling efforts, including the collection of surface sediments to aid the understanding of sources and to support the ERA. Concurrent bioassay testing will occur in Round 2 at a significant number of these stations to support the benthic assessment for the ERA. Round 2 also will involve collection of subsurface cores to evaluate subsurface distributions of chemicals in areas where those sediments could act as sources and in navigation or maintenance dredge areas. Identification of actual core locations will occur in the various Round 2 FSPs. Hydrodynamic modeling and bathymetry survey results will help focus the subsurface sampling locations on areas of potential scour. Round 2 will include a limited number of subsurface cores to assess the potential presence of natural attenuation processes in the ISA.

Round 3 sediment sampling is intended to support the FS (see Section 8). However, data gaps related to uncertainties in the preliminary risk assessments and/or sources could be filled in Round 3 should this information be needed to make a risk management decision.

Surface Sediments Approach

In addition to the objectives presented in Section 6.4.3, a number of factors will be considered when selecting surface sampling locations:

- **Proximity to Sources.** Sediment sample locations will be placed near known and suspected historic and ongoing sources, including seeps, outfalls, utility crossings, and potential groundwater discharge areas. The intent of such sampling is to understand the effect of any such sources on sediments in the river.
- **Proximity to Overwater Structures.** Sediment sample locations will be placed near product transfer points (fuels and solid products) and docks to better understand these potential sources.
- **Previously Uncharacterized Areas.** Where there are exposure areas with little historic data, additional samples will be located to better understand the distribution of chemicals that may pose unacceptable risk or act as sources.
- **Nearshore Areas.** Sediment sample locations will be placed in previously uncharacterized nearshore areas because of the proximity of sources and the higher value of this habitat to biological resources. As evident from the maps provided and

discussed in Section 4, chemical concentrations tend to be highest in nearshore areas.

- **Sediment Transport.** Sediment sample locations will be placed in accreting areas rather than erosional areas. However, some sampling may occur in erosional areas to help understand the effects of erosion on chemical concentrations in these areas.

Sampling locations and methods will be presented in the FSP(s). The depth of sampling will be 1 foot, which is based on evaluation of bathymetric changes between December 2001 and August 2002 (DEA 2003) and potential ecological and human health exposure areas. Chemical analysis of surface sediments will follow the Round 2 QAPP until such time when a reduced list of COPCs may be available. Certain analyte groups will only be analyzed under specific conditions, including:

- VOCs will be analyzed where available groundwater data suggest that VOCs may be reaching the river.
- Butyltins will be analyzed offshore from ship repair/maintenance and storage facilities that were in operation after the introduction of TBT as an antifoulant.
- Dioxins and furans will be analyzed offshore from potential source areas and at a small number of stations distributed throughout the ISA.

Fish tissue analytical results may also be used to identify areas where these additional analyte groups will be analyzed.

Subsurface Sediments Approach

Subsurface sediment sampling will occur over two primary sampling events, with different objectives for each event. In Round 2, subsurface data will be generated to support the evaluation of potential sources and the presence of natural attenuation processes. The approach for and reasoning behind natural attenuation sampling is detailed in Section 8 and Appendix A. In Round 3, subsurface data will be generated to support the FS.

In a dynamic riverine system such as the LWR, sediments are eroding and accreting along variable spatial and temporal scales. It will be important in this system to evaluate subsurface sediment chemistry in areas that have the potential for erosion to cause buried sediments to become surface sediments and therefore potential sources.

The bathymetric surveys already completed by the LWG (DEA 2002a, 2003) demonstrate that typical erosional and depositional forces may result in changes to sediment elevations that can be on the order of a few feet in some places, although in most areas the river bed elevation changes were less than or equal to one foot. These surveys were conducted during a year that was characterized by relatively typical

flows for the last decade. In periods of higher flows and during flood events, there may exist a greater chance for sediment scour and re-deposition. Therefore, it is important to evaluate the chemistry of buried sediments in areas that may be scoured during extreme flow events.

Results from the hydrodynamic/sedimentation modeling that is being undertaken by the LWG will be available 120 days after EPA approval of the modeling approach technical memorandum. Based on modeling results, additional core locations may be identified as data gaps for Round 3 sampling (see Table 7-2).

Berthing areas are often associated with scour due to prop wash and are often dredged for navigation purposes. Review of either the 2001 or 2002 bathymetric maps (DEA 2002a, 2003) shows likely areas of prop-wash-induced sediment scour off several facilities. Again, it will be important to evaluate sediment chemistry in known or historic source areas that have the potential for erosion (e.g., from prop wash) and/or areas of potential navigational dredging that could cause buried sediments to become surface sediments.

Following the preliminary risk assessments, the LWG will identify SMAs that will contain areas that pose an unacceptable risk. If dredging is a reasonable remedial alternative for one or more of the SMAs, then additional subsurface chemical data may need to be collected during Round 3 and the RD/RA to refine the depth to which contamination extends and collect information on sediment engineering properties. Similarly, if natural attenuation is to be considered for an SMA, then appropriate subsurface sediment data will be collected in Round 3 to determine the efficacy of site-specific natural attenuation processes. SMA-specific information on sediments may also be needed for other alternatives such as capping or aquatic disposal, including additional surface/subsurface chemical and/or physical data.

7.2.2 Surface Water

Surface water samples will be collected to identify potential sources, to understand the distribution of chemicals resulting in potentially unacceptable ecological and human health risk (described in Sections 7.3 and 7.4), and to understand the potential for recontamination for the FS (described in Section 8).

The DQO process for understanding the distribution of chemicals in surface water is summarized in Table 7-4.

Problem Description

There is little existing water quality data for the ISA. Therefore, the objectives of the water sampling program are to assess water quality conditions in the ISA under different flow conditions, provide water quality data for use in the ecological and human health risk assessments, and provide water quality data for the assessment of recontamination potential during the FS.

Data Uses

Surface water data will be used to determine:

- If upland sources in the ISA are contributing to unacceptable risk from river water
- Support for the ecological and human health risk assessments
- If various river stages and flows and storm events have a measurable effect on the nature or concentration of surface water chemical constituents
- The impact to the ISA of potential upstream sources of surface water chemical constituents
- The potential presence of natural attenuation processes within the ISA
- The potential for recontamination of remedial alternatives (examined in the FS).

Data Needs

Sampling and analytical methods must be adequate to achieve detection limits that are below risk-based water quality screening levels. Sampling will be conducted during an early fall “first flush” stormwater runoff event and both low-flow and high-flow river conditions. Sample location and density must be adequate to assess variation in chemical concentrations in surface water immediately upstream, downstream, and within the ISA. Sample location and density must also be adequate to understand the potential for source effects to river water and sediments.

RI/FS Tasks

A tiered approach to the water quality investigation is proposed. Surface water sampling was proposed by the LWG but not approved by EPA in Round 1. In Round 2, surface water samples will be collected using high-volume sampling methods at three transects: one transect at RM 11 above the upstream boundary of the ISA, one transect at RM 6.3 within the ISA, and one transect at RM 4 at the lower boundary of the ISA. Upstream samples will be used to evaluate the upstream contribution of chemicals to the ISA. High-volume samples also will be collected at four locations (Rhône Poulenc, Willamette Cove, ATOFINA, and Portland Shipyard) during an optimum-flow sampling event to assess potential source effects. Grab samples will be collected to support the ERA. Grab samples will also be collected in potential swimming areas to support the HHRA.

Specific Round 2 water quality sample locations, analyses, collection methods, and required analytical detection limits will be provided in the Round 2 surface water sampling FSP. High-volume surface water sampling methods will achieve minimum reporting limits below chronic and acute Ambient Water Quality Criteria (AWQC) and Oak Ridge National Laboratory ecological screening values and below AWQC

for the protection of human health and EPA Region 9 PRGs. Grab sampling methods will achieve minimum reporting limits below chronic and acute AWQC and Oak Ridge National Laboratory ecological screening values and below EPA Region 9 PRGs for all COPCs except N-nitrosodimethylamine, toxaphene, and dioxins/furans. These criteria are used to identify analytical reporting limits and for screening purposes.

Additional surface water samples will be collected in Round 3 for analysis of persistent, bioaccumulative toxins (PBTs) using high-volume sampling methods if a data gaps analysis based on Round 2 sampling results, the ecological preliminary risk evaluation, food web modeling results, and groundwater impacts evaluation scoping determines that additional surface water data with very low minimum reporting limits are needed to develop PRGs or evaluate source effects. Similarly, if additional surface water sampling to determine chemical distributions, source effects, natural attenuation, or recontamination potential is necessary, the proposed approach will be presented in a Round 3 FSP.

7.2.3 Groundwater

Table 7-5 summarizes the DQO process for understanding the hydrogeologic physical system and the effects of groundwater discharges on ecological and human health risks and the distribution of chemicals in sediment.

Problem Description

In the physical conceptual site model (see Figure 5-1), groundwater flow is identified as a possible pathway between upland sites and the Willamette River. COIs are present in groundwater underlying a number of upland sites along the ISA. Because the river is a primary discharge point for the groundwater from the upland sites, it is important to determine whether these COIs can migrate to the Willamette River at concentrations that pose a potential human health or ecological risk. In addition, it is important to consider the total loadings of persistent, bioaccumulative toxins (PBTs) to the river.

Among the media investigated in the RI/FS, groundwater is unique because of the regulatory framework established by the memorandum of understanding (MOU) between EPA and DEQ (EPA et al. 2001). For purposes of the RI/FS, upland releases are assumed to be the source of contaminated groundwater. According to the MOU, DEQ has lead authority for investigating upland releases and, if necessary, requiring source control measures to protect sediment and water quality in the Willamette River against the threat of ongoing contamination from such releases. The purpose of DEQ investigation and source control measures is to identify and eliminate ongoing upland sources of contaminated groundwater that are contributing, or threaten to contribute, contaminants to the ISA.

Because of its focus on risk in the Willamette River, the groundwater component of the RI/FS will ultimately concentrate on evaluating the risks to human and ecological receptors from contact with groundwater contaminants that have been transported to the Transition Zone (including sediment and water) or surface water through seeps within the Site. The groundwater component of the RI/FS should consider the risk presented from the cumulative effects of PBTs entering the river and subsequent bioaccumulation in fish. To accomplish this, information on known groundwater sources impinging on the river is needed to identify chemical contaminants and potential exposure points in the river. In addition, information is needed to identify areas where groundwater contamination is possibly affecting the river, but cannot be confirmed with existing upland or in-water information. Under the Source Control Strategy, DEQ and EPA will implement a formal screening process to identify sites where groundwater COIs may result in unacceptable risks in the river. The combined upland investigations and Source Control Strategy processes provide a high degree of confidence that most of the sites where contaminated groundwater may adversely affect the Site are identified for consideration in the RI/FS.

As part of DEQ's ongoing Cleanup Program, DEQ has overseen or conducted extensive investigations of groundwater at upland sites adjacent to the ISA. The resulting data provides a basis for evaluating the effects of contaminated groundwater on risk in the river. However, additional information will be necessary to evaluate areas where data are insufficient to determine the need for further analysis. (Identification of such areas and the associated data needs are addressed in following sections.) Once groundwater contamination has reached the river, the receptors potentially most affected are benthic-dwelling fish and invertebrates. Human exposure may also occur through dermal contact with groundwater emerging as seeps in beach areas. In addition, contaminated groundwater discharging to areas of relatively isolated or quiescent waters may affect surface water quality and result in exposure to fish and/or amphibians. Humans and higher trophic-level ecological receptors could also be indirectly affected if groundwater COIs sorb to sediments, disperse in surface water to unacceptable levels, or bioaccumulate in prey items.

The potential for groundwater contaminants to affect ecological risk in sediments is highly dependent on the characteristics of the contaminants being introduced to the sediment. Groundwater contaminants with low water solubility and high soil/sediment adsorption coefficients will preferentially sorb to sediment particles, and only a small fraction will partition from sediment to the aqueous phase. Metals and hydrophobic organic contaminants typically have low mobility and high sediment sorption characteristics. For these chemicals, the aqueous concentration in the Transition Zone is controlled by the rate at which the chemical desorbs or dissociates from the solid phases and becomes available in Transition Zone water to benthic infauna. Toxicity and risk of such chemicals to ecological receptors can be assessed through chemical analysis or toxicity testing of bulk sediment samples from locations where the chemicals in groundwater are discharging to the Transition Zone.

Groundwater contaminants with high water solubility and low soil/sediment adsorption coefficients may not sorb to sediment, but may affect aqueous concentrations as contaminated groundwater moves into the Transition Zone. Other factors, such as organic carbon content of the sediment, volatility and degradation of the groundwater contaminant(s), and co-solvency mechanisms, will also affect the fate and transport of groundwater contaminants through the Transition Zone. Concentration of such chemicals in Transition Zone water is more likely to be dependent on the concentration in groundwater entering the Transition Zone and the extent to which it mixes with water from other sources. Such chemicals may not be identified in bulk sediment samples, and separate sampling methods may be necessary to estimate exposure where such contamination may occur and present a risk to identified ecological receptors, which are expected to be primarily benthic organisms.

Data Uses

The overall objective of the groundwater evaluation is to assess whether contaminated groundwater discharging to the ISA causes unacceptable risks to ecological and potential human receptors. Consequently, the groundwater evaluation process is integrated with the ERA and HHRA. Data collected to evaluate the impact of contaminated groundwater discharging to the ISA will be used to:

- Identify the locations and extent of contaminated groundwater impacts and the COI concentrations or measured toxicity of the potential impacts in the ERA
- Identify potential human exposures to COIs in groundwater seeps and to assess human health risks from that exposure in the HHRA
- Determine SMAs (see Section 6) within the Site
- Identify preliminary remedial actions.

The overall approach adopted by the LWG for evaluating effects of groundwater contaminants on sediments is consistent with the tiered approach for groundwater/surface water assessments recommended by EPA (2000b). The approach requires repeated integration of the site characterization and ERA tasks of the RI/FS.

Data Needs

Data needs for evaluating the potential impacts from groundwater contaminant discharge to the river are location-specific, and thus will be determined site-by-site based on the type of COIs present in groundwater as well as the existing understanding of groundwater flow and discharge. Data needs for the groundwater evaluation will be assessed by:

1. Compiling and evaluating existing data from DEQ files and published literature on the physical hydrogeologic system and upland contaminated groundwater distributions to identify where groundwater contamination is confirmed or has a reasonable potential to discharge to the ISA and identifying the COIs for these discharges
2. Developing an understanding of the physical relationship between groundwater and surface water within the ISA and the influence of the hydrogeological physical system on exposure pathways in the ISA
3. Refining and updating the hydrogeological CSM
4. Developing a process for assessing and focusing the areas for further evaluation and identifying the types of samples for addressing the data needs.

The updated CSM report will provide the results of the compilation and evaluation of groundwater physical system and groundwater quality data and a discussion of the influence of the hydrogeological physical system on exposure pathways in the ISA. The CSM will be augmented as additional information is gained through RI characterization tasks. The process for focusing the evaluation of potential impacts to sediment, the Transition Zone, seeps, and surface water from chemicals in groundwater discharging to the river, as described later in this section, will be negotiated with EPA prior to implementation.

If data needs are identified for characterizing potential impacts to receptors from groundwater discharging to the river, the LWG in cooperation with EPA will assess the need for additional data collection. The types of data needed to evaluate the potential for effects of exposure of receptors to groundwater discharges to the river or human use areas will vary on a site-by-site basis and may include one or more of the following:

- Chemistry of bulk sediment samples
- Chemistry of water samples obtained from the Transition Zone
- Chemistry of seep samples in human use areas
- Chemistry of surface water samples in quiescent areas
- Groundwater flow measurements
- Toxicity testing to support the ERA.

The activities and tasks for evaluating the potential impacts will be described in separate field sampling plans for individual sampling events.

RI/FS Tasks

As with other aspects of the RI/FS, the groundwater evaluation involves integrating data needs for characterizing chemical distributions in the river with those of the ERA

and HHRA, on which risk characterization decisions will be made. The proposed RI/FS tasks associated with groundwater are:

- Task 1: Groundwater Data Review and CSM Update,
- Task 2: Process for Assessing and Focusing Data Needs,
- Task 3: Data Collection.

A description of each of these tasks is provided below.

Task 1. Groundwater Data Review and CSM Update

The objective of this initial task is to use the data compiled during the groundwater data review to update the hydrogeological CSM for the site. Specifically, the updated CSM will reflect the results of the groundwater data review and will include the following information:

- Description of the physical hydrogeologic framework, groundwater flow systems, and surface water/groundwater interactions
- Categorization of upland sites based on availability of groundwater chemistry data, presence of groundwater containing COIs, and presence of complete or likely complete exposure pathways to receptors in the river.

The existing hydrogeologic data compiled during the groundwater data review will be used to understand the following specific attributes of the physical hydrogeologic system:

- The nature and location of groundwater discharges
- Spatial relationship between hydrostratigraphic units and the river
- Spatial and temporal changes in groundwater flow and river stages.

The groundwater data will also be used to categorize the upland sites within the ISA based on available groundwater chemistry information, as follows: 1) sites where groundwater containing COIs are known or suspected to discharge to the river, 2) sites where COIs are present in groundwater but where upland data are insufficient to assess the potential for COIs to reach the river, and 3) sites where groundwater data are not available.

Upland sites where groundwater containing COIs are known or suspected to discharge to the river will be categorized based on the following factors:

- Known past or present releases of NAPL or aqueous-phase concentrations of COIs

- Frequent detections or high concentrations of COIs in groundwater samples collected adjacent to the riverbank
- High concentrations of COIs or NAPL in groundwater that intersects human-made or natural preferential pathways that potentially discharge to the river
- High concentrations of COIs or NAPL that are not adjacent to the river bank or do not intersect preferential pathways but COIs still have the potential to reach river sediments
- Presence of a complete exposure pathway between groundwater and receptors in the river.

Sites where COIs are present in groundwater but where available upland data are insufficient to assess the potential for COIs to reach the river will be referred to DEQ to address per the Source Control Strategy. Sites for which groundwater data are not available will be assessed using historical land use information, including historical aerial photographs and Sanborn maps, as available, to identify sites where there is a reasonable possibility for impacts to groundwater based on historical site uses. For these sites, available information will be summarized and recommendations made to DEQ for site assessment purposes. For sites where groundwater data gaps have been identified and where groundwater data are not available through the groundwater data review process and cannot be readily obtained for a particular site based on the RI/FS schedule, the LWG will evaluate the potential groundwater impacts to the river on a site-by-site basis and will implement a process for assessing data needs and potential data collection activities, as described under Tasks 2 and 3 below.

The physical hydrogeologic data and information on COIs in groundwater will be integrated with the information collected during the October 2002 seep reconnaissance survey (GSI 2003b) to refine the hydrogeologic CSM (Section 5.1). The CSM will continue to be updated following incorporation of data collected during subsequent RI/FS characterization activities.

Task 2. Process for Assessing and Focusing Data Needs

The objective of this task is to identify and focus areas where potential effects of chemicals in groundwater discharging to the river need further evaluation. The process for assessing and focusing these data needs will be developed in cooperation with EPA prior to implementation. It is anticipated that the areas requiring additional data and the types of data collection necessary to achieve this objective will vary between locations depending upon COIs and other site-specific data needs.

The process for assessing and focusing data needs will be based on the following information:

- Location(s) and geometry of upland groundwater COI plumes

- Horizontal and vertical groundwater gradients (groundwater flow direction) at the upland sites of interest
- Upland hydrostratigraphic information
- Locations where the groundwater pathways to receptors in the river have been identified as complete
- A survey to identify the locations of focused groundwater discharge
- A conservative contaminant screening step.

The first three sources of data information listed above will be evaluated and summarized as part of the updated CSM document. This information will be integrated with the groundwater discharge survey data and the contaminant screening to identify appropriate areas offshore of upland sites where groundwater COIs have a reasonable potential to reach the river. Also, the groundwater discharge survey data and the contaminant screening assessments, as described below, will be conducted iteratively to better focus the sampling effort on areas where there is a potential for impacts to receptors from groundwater discharging to the river.

Pilot studies may be conducted to evaluate the scope of RI groundwater sampling efforts and to evaluate sampling methodologies. If the pilot studies are deemed prudent, the details will be developed in cooperation with EPA in a technical memorandum prior to initiating any field work.

Groundwater Discharge Survey Assessment

The data needs assessment process will identify locations of groundwater discharge that should be further evaluated. The steps that will be used to identify these locations and the methodology for the assessment will include the following:

1. Evaluate the feasibility of utilizing survey tools (e.g., towed probes) to identify groundwater discharge areas on a site-specific basis.
2. Where feasible, use groundwater flow direction, plume location and geometry, and available stratigraphic information to guide a site-specific groundwater discharge survey at sites identified in Task 1 and through the contaminant screening assessment by using the appropriate techniques, such as forward-looking infra-red (FLIR) or towed probes.
3. Interpret the results in the context of the upland information.
4. Where use of survey techniques is not feasible, use groundwater flow direction, plume location and geometry, available stratigraphic information, the results of the contaminant screening,

and, if necessary based on consultations with EPA, other survey techniques such as an in-water stratigraphic survey to identify possible discharge areas.

5. Integrate information with the CSM and contaminant screening assessment to identify areas where groundwater discharge should be assessed using survey methods.

Contaminant Screening Assessment

The data needs process will also evaluate the potential for impacts to ecological and human receptors through a conservative screening level assessment. As stated above, the combined results of the screening step together with the information from the CSM and the groundwater discharge survey data will be used to focus the groundwater data collection task on areas where groundwater COIs have a reasonable potential to reach the river. The details of the screening approach to focus the evaluation of the exposure of ecological and human receptors to chemicals transported in groundwater discharging to the river will be proposed and negotiated with EPA prior to implementation. It is expected that sites where concentrations of COIs in groundwater do not or are not likely to reach the Transition Zone at concentrations that exceed conservative screening criteria (e.g., AWQCs) will not require additional sampling.

Ecological Screening Approach

Data needs for evaluating potential impacts to ecological receptors will be identified based on the results of prior tasks and an evaluation of COI characteristics. For locations where COI concentrations exceed screening criteria, chemical characteristics of the COIs will be evaluated for their preference to sorb to sediments. Criteria, including octanol-water partitioning coefficients (K_{ow}), organic carbon partitioning coefficients (K_{oc}), or soil/water partitioning coefficients (K_d), will be used in this analysis. In addition, physical characteristics of sediments and the types of contaminants that are present will also be considered to help determine appropriate media to be sampled.

Locations with COIs that preferentially sorb to sediments will be evaluated using bulk sediment samples and standard risk approaches for assessing effects to benthos. Locations with COIs that preferentially partition to the aqueous phase may be subjected to alternative sampling and analyses for characterizing exposure and risk, such as sampling of Transition Zone water and/or surface water sampling in quiescent areas. The type of sampling and analysis will include techniques that could be used for estimating exposure point concentrations. As noted previously, the types and quantity of sampling will be site-specific.

The details of the screening process, including the types of data to be screened and the screening-level values, will be discussed with EPA prior to implementation. Upon EPA approval, the proposed processes will be integrated into the ERA

approach and documented in a technical memorandum that will become part of the RI/FS Work Plan.

The results of this analysis and data collected during Round 2 and Round 3 of the RI will be incorporated into the ERA approach for benthic organisms and, if applicable, other receptors. The specific processes for risk analysis are detailed in the ERA approach (Appendix B).

Human Health Screening Approach

Data needs for assessing potential impacts to human receptors from COIs in groundwater discharging to the river will be evaluated using the results from the groundwater data review and seep reconnaissance survey through the following steps:

1. Compare upland sites identified in Task 1 (groundwater data review and conceptual model) that have a potential for COIs to discharge in groundwater with the identified seeps in potential human use areas. This comparison will assess whether any of the sites are located upgradient from the seeps where direct human contact could occur.
2. After the evaluation described above is completed, the LWG, in consultation with EPA and its partners, will determine which seeps will need further evaluation for human health risk assessment and the methods that will be used for this evaluation. This evaluation may include assessment of existing groundwater data or of new data collected by the LWG or other parties.

Seeps will be sampled to determine exposure point concentrations at human use areas where the exposure pathway for groundwater COIs is complete and may result in a risk to human receptors. Details of how risks from these pathways will be incorporated into the HHRA are described in the HHRA approach (Appendix C).

Task 3. Data Collection

Based on the results of the process for assessing and focusing data needs (Task 2), a sampling program will be designed to address data gaps where there is potential for groundwater impacts to human or ecological receptors. Details on the specific activities and sample locations will be described in separate FSPs submitted to EPA prior to implementation. It is expected that this data collection effort will occur during Round 2 and possibly in Round 3, if deemed necessary.

Based on current knowledge of the groundwater data, potential data collection efforts may include one or more of the following:

- Chemistry of bulk sediment samples for COIs that sorb to sediments at locations where concentrations exceed screening criteria, and where data gaps have been identified and

groundwater data adequate for assessing potential impacts to the river cannot be obtained in a timely fashion based on the schedule for the RI/FS

- Chemistry of samples of water in the Transition Zone for COIs that may not sorb to sediments at locations where concentrations exceed screening criteria, and where data gaps have been identified and groundwater data adequate for assessing potential impacts to the river cannot be obtained in a timely fashion based on the schedule for the RI/FS
- Chemistry of seep samples in human use areas.
- Chemistry of surface water samples in quiescent areas
- Groundwater flow measurements, where groundwater data adequate for assessing potential impacts to the river cannot be obtained in a timely fashion based on the schedule for the RI/FS
- Toxicity testing (as necessary for the ERA).

The potential effects of exposure of ecological receptors to groundwater discharging to the Transition Zone will be evaluated through sampling of sediment and water within the Transition Zone. Sediment and water sampling within the Transition Zone will be considered at potential groundwater discharge locations where groundwater COIs are confirmed to discharge or have a reasonable likelihood to reach the Transition Zone within the river. Sample density will be sufficient in the vicinity of these discharge areas to allow representative characterization of groundwater that poses a potential risk to biota.

The potential effects of exposure of humans to groundwater discharging in surface seeps will be assessed based on seep sample chemistry in defined human use areas. The effects of exposure of biota to groundwater discharges in quiescent areas will be evaluated through surface water sampling in such areas. Potential risks to human or ecological receptors associated with possible indirect exposure to COIs in groundwater will be evaluated using sediment, surface water, and tissue data.

Coordination of surface water and in-water groundwater data collection will be important at locations where groundwater COIs are assessed in order to understand potential relationships between chemicals detected in groundwater and surface water quality while reducing possible temporal variability.

Assessment of the potential effects on receptors and surface water of certain COIs transported in groundwater to the Transition Zone and surface water may require an integrated sampling approach involving both measurement of physical groundwater flow parameters and chemical sampling in the river. The types of data and techniques for obtaining the data are discussed in the following sections.

Physical Groundwater Data

Physical groundwater flow data may include measurement of groundwater flow direction and groundwater flux rates depending on the data needs for a particular location. The direction of groundwater flow adjacent to and in the river may be important for assessing the location and extent of the area where chemicals in groundwater may discharge to the Transition Zone and surface water. Groundwater flow information from individual sites will be used for assessing physical hydrogeological conditions in the Transition Zone where available and adequate. In areas where site-specific data are not available, groundwater flow proximate to the river is assumed to be directly towards the river or at perpendicular flow patterns to the river. Measurement of hydraulic head using nested mini-piezometers can be used, as necessary, where an understanding of vertical groundwater gradients is needed.

To assess risk and recontamination potential, knowledge of groundwater flux may be important for understanding local or overall contaminant flux and loading from a COI plume. The general rate of groundwater flux can be calculated from the hydraulic gradient and hydraulic conductivity measurements where these data are available from upland sites. When these data cannot be estimated from existing information, the groundwater flux rate in a localized area can be measured using seepage chambers.

Chemical Groundwater Data

The techniques used to collect water chemistry data from the Transition Zone or groundwater depend on the uses of the data and types of contaminants targeted. The sampling technologies typically used for assessing chemicals transported in groundwater to the river can be divided into two categories: passive and active. A brief description of proposed sampling techniques for each category is provided below. Specific sampling techniques for physical and chemical groundwater data will be described in FSPs for individual sampling events.

Passive Sampling Devices. Passive devices include semipermeable membrane devices (SPMDs), diffusion samplers, and peepers. Passive sampling techniques involve placing a sampling device in sediment or in the water column and allowing that device to reach chemical equilibrium with the surrounding media over time. The time required for equilibrium is dependent on the properties of the contaminants of interest. Passive devices provide quantitative or semi-quantitative results that may be used in a variety of RI/FS applications.

Active Sampling Devices. Active sampling devices are designed to obtain a representative concentration of a chemical in groundwater, including in the Transition Zone. Samples obtained using active sampling devices are concentrations representing a spatial and temporal point. Active sampling devices include mini-piezometers, temporary direct-push devices (e.g., Geoprobess®), and multi-level sampler devices.

7.3 ECOLOGICAL RISKS

Ecological receptors may be exposed to chemicals resulting from historical and ongoing releases and/or sources within Portland Harbor. Potential receptors in the ISA include species of aquatic plants, amphibians, reptiles, benthic and epibenthic invertebrates, fish, birds, and mammals. Exposure may occur through direct contact with sediment or water or through ingestion of sediment, surface water, and prey items. Tables 7-6 through 7-10 present the DQO process for assessing ecological risk. Appendix B describes the ERA approach.

7.3.1 Problem Description

Chemicals in sediment, water, or biota in the ISA may result in unacceptable risks to ecological receptors. The objective of the baseline ERA is to estimate potential risks to ecological receptors associated with exposure to chemicals resulting from historical and ongoing releases or sources within the ISA.

7.3.2 Data Uses

Data collected to support the ERA will be used to determine whether chemicals in sediment, water, or biota resulting from historic and ongoing releases or sources in the ISA cause unacceptable risks to ecological receptors and warrant consideration of further investigation or possible response action.

7.3.3 Data Needs

Chemicals in sediments (including solid and aqueous phases) and surface water may have adverse effects on ecological receptors through direct contact or ingestion of sediment and surface water. Therefore, areas where potential receptors could be exposed to sediments and surface water need to be identified. These exposure areas will be identified by evaluating the ecology, particularly the foraging habits, of all receptor species. Sediment and surface water data will be collected from those areas where exposure could occur.

Biota that have accumulated chemicals from surface water and sediment in the ISA could pose risks to ecological receptors that ingest those biota. Therefore, to evaluate potential risks to ecological receptors that prey on biota within the ISA, tissue data from representative prey items are needed.

Groundwater may be a source contributing to elevated chemical concentrations within the ISA. Therefore, to evaluate whether the discharge of contaminated groundwater to the ISA presents a risk, exposure points for groundwater will need to be identified. A review of historic data, physiochemical aspects of chemicals in groundwater, and the potential for ecological risks not already captured in the aquatic invertebrate risk evaluation needs to be completed.

7.3.4 RI/FS Tasks

As discussed in previous sections, the RI/FS will be an iterative process that includes multiple rounds of data collection. Data to support the ERA includes the following:

- Pre-AOC data
- Historic Category 1 data
- Round 1 data
- Round 2 data
- Round 3 data (if necessary to reduce uncertainties).

The following specific RI/FS tasks will address the data needs of the ERA:

1. All of the pre-AOC data collected under the stipulated agreement were used to develop the preliminary conceptual site model for the ERA.
2. The historic Category 1 data will be used in estimating risk to ecological receptors. Historic Category 1 and 2 data were used in scoping the ecological risk assessment (e.g., to better understand tissue concentrations from historic studies and to better understand the trends in sediment chemical distributions).
3. During Round 1, surface sediment samples were collected in areas that were identified, using existing data, as potential sources and provide ecological habitat for selected receptors. These data will be used in estimating risks.
4. Collocated with the sediment samples in Round 1, crayfish and sculpin tissue, benthic community, and, where possible, clam tissue samples were collected. The exact analyte list for each sample type is described in the Round 1 QAPP. These analytical results and benthic community characteristics will be used to refine the conceptual site model and as input into the preliminary risk evaluation. These data will also be used to assess the relationship between sediment and tissue concentrations.
5. In addition to these data, physical system and source information (e.g., bathymetry, seep reconnaissance) will be applied in the evaluation of the effect of groundwater on exposure pathways and its potential risk to infaunal invertebrates.
6. Data pertaining to the physical system (e.g., bathymetry) will be used to update the exposure scenarios for the ERA.

The following additional tasks will be performed to fill data needs for the baseline ERA:

1. Collection of surface water chemistry data in quiescent areas within the ISA for the purposes of determining exposure concentrations to aquatic invertebrates, fish, and amphibians from the surface water pathways.
2. Collection of bulk surface sediment samples for bioassay testing across the gradient of chemical concentrations observed in historic and 2002 data.
3. Collection of additional sediment chemistry samples, as needed, to fill any data gaps that remain after the 2002 sampling (e.g., assessment of the dietary pathways to fish and wildlife).
4. Collection of site-specific data, as needed, to parameterize the food web model that will be used to establish sediment preliminary remediation goals.

Data collected in Round 2 will be used to further refine the CSM and identify remaining data gaps. Additional data may be collected in Round 3 as needed to complete the risk assessment. The information collected in Rounds 1, 2, and 3 will be applied in the draft baseline ERA.

7.4 HUMAN HEALTH RISKS

Human receptors may be exposed to chemicals that are a result of historical and ongoing releases and/or sources within the ISA. Potential human uses in the ISA include occupational, recreational, transient, and fish consumption scenarios. Exposure may occur through direct contact with sediment or water or through ingestion of fish or shellfish. Appendix C contains the HHRA approach.

7.4.1 Problem Description

Chemicals in sediment, water, or biota in the ISA may result in unacceptable risks to some human receptors. However, these risks have not been estimated for human receptors. The objective of the HHRA is to estimate potential risks to human health associated with exposure to chemicals that are a result of historical and ongoing releases and/or sources within the ISA. Details of the DQO process used to develop data needs for the HHRA are included in Table 7-11.

7.4.2 Data Uses

Data collected to support the HHRA will be used to determine whether chemicals in sediment, water, or biota that are the result of historic and ongoing releases and/or

other sources to the ISA cause unacceptable risks to human health and warrant consideration of further investigation or possible response action.

7.4.3 Data Needs

Chemicals in sediments and surface water may have adverse effects on human receptors in areas where direct contact with those media occurs. These areas need to be identified, and human activities that could occur in those areas need to be evaluated to assess the potential for direct contact with sediment or surface water. Sediment and surface water data are then needed to evaluate risks from human activities that could result in direct contact.

Although groundwater is not anticipated to result in significant risks to human health, groundwater could result in potential risks to human receptors if direct contact with groundwater seeps occurs on a frequent basis and chemical concentrations in groundwater are high enough to pose a risk. Direct contact with groundwater may be a complete exposure pathway for human receptors at some beaches designated as human use areas, specifically at locations where groundwater seeps are found on the beach above the water line. Therefore, potential exposure points for seeps need to be identified. Results of a field reconnaissance survey conducted during low water to identify potential groundwater seep locations above the water line will be reviewed to determine if any of these seeps are located within potential human use beaches. Available upland groundwater data near any beaches identified in this review would also need to be reviewed to assess the potential for the presence of chemicals in these groundwater seeps at concentrations of concern. Additional data needs for the HHRA related to the groundwater pathway will be assessed as part of the groundwater evaluation, as described in Section 7.2.3.

Biota that have accumulated chemical constituents from surface water and sediment in the ISA could pose risks to human receptors who ingest those biota. Therefore, to evaluate risks to human health associated with consumption of biota, the fish and shellfish species that are caught in the ISA and consumed by humans need to be identified. If the HHRA indicates that consumption of biota from the ISA could result in unacceptable risks to human health, a model will be needed to estimate sediment and water chemical concentrations that could result in the chemical concentrations detected in biota tissue. Site-specific (and congener-specific, if needed) biota sediment accumulation factors (BSAFs) and bioconcentration factors (BCFs) will likely be required as inputs to the model. Data needed for the model will be collected during Rounds 2 and 3, as needed.

7.4.4 RI/FS Tasks

As discussed in previous sections, the RI will be an iterative process that includes multiple rounds of data collection. Data to support the HHRA include the following:

- Pre-AOC data
- Historic Category 1 data
- Round 1 data
- Round 2 data
- Round 3 data (if necessary for the food web model).

The draft baseline HHRA will be completed following Round 3.

RI/FS tasks that have been conducted to date to support the HHRA include the following:

1. The preliminary conceptual site model for the HHRA was developed based on pre-AOC data.
2. Historic data were compiled and categorized. Historic Category 1 data will be evaluated to identify data that could be used in the baseline HHRA. The results of this evaluation will be submitted to EPA as an interim deliverable. Historic Category 1 data will only be used in estimating risk to human receptors if appropriate for the receptors and exposure pathways that will be evaluated in the HHRA. Historic Category 1 and 2 data were used in scoping the HHRA (e.g., to better understand tissue concentrations, to begin evaluation of trends in sediment chemical distributions).
3. During Round 1, beach sediment samples were collected in human use areas where direct contact with sediment could occur. The basis for selecting human use areas is described in Appendix C. Because potential contact with beach sediment would be ongoing and would occur throughout a beach area, composite surface sediment samples were collected to be representative of the type of exposure that could occur. Beach sediment samples were collected during low tide and at low water when the maximum beach area was exposed. These data will be used in estimating risks to human health.
4. A limited qualitative survey was conducted to identify target fish and shellfish species for human consumption. The survey included interviews with two local fishers, as well as a review of the investigation by the Oregonian and the limited surveys of other portions of the Willamette River (ATSDR 2002). Based on the results of the survey and to support the HHRA, four resident fish species and shellfish (crayfish) tissue samples were collected in the ISA during Round 1. Fish and shellfish tissue data collected in the ISA during the Round 1 field studies will be used

in the baseline HHRA to estimate potential risks to human health from fish consumption.

5. A reconnaissance survey of groundwater seeps, conducted in October 2002, found seeps at or near 12 beaches identified as potential human use areas. A methodology for evaluating seeps for potential human health risks will be discussed with EPA and its partners and incorporated into the HHRA Approach (Appendix C), when approved.

The following additional tasks will be performed to fill data needs for the baseline HHRA:

1. Composite surface sediment samples were collected at human use beaches to be representative of potential human exposures, but these samples may not be appropriate for evaluation of response actions. Therefore, the results of beach sediment samples from Round 1 will be compared to appropriate Region 9 PRGs for soil to evaluate whether discrete beach sediment samples are needed. If the composite sample for a beach exceeds risk-based screening levels, that beach will be identified and the need for further data collection will be evaluated. Results of the evaluation of the beach sediment samples will be submitted to EPA as an interim deliverable. If needed, additional beach sediment samples will be collected during Round 2.
2. Upland groundwater data will be compiled for the RI/FS. The upland groundwater data for sites adjacent to beaches where groundwater seeps were identified will be reviewed during Round 2. The data review will evaluate whether chemicals might be present in groundwater at the point of discharge in human use areas.
3. Surface water samples will be collected in Round 2 within quiescent river areas near selected recreational beaches and unsecured riverfront areas where transient encampments have been observed. These are areas where swimming and other direct contact could occur. These data will be used to evaluate potential risks to human health associated with ingestion of, or dermal contact with, surface water. To address site characterization data needs, surface water samples will also be collected during Round 2 from three river transect locations. These samples should be representative of surface water conditions in non-quiescent areas within the ISA. Samples collected from these locations could also be used to evaluate potential direct human contact with surface water (e.g., during windsurfing) in non-quiescent areas of the ISA.

4. Finally, if the risk assessment finds that fish consumption may result in unacceptable risks to human health, a food web model will be needed to evaluate the relationship between sediment, surface water, and tissue. Site-specific data (sediment, surface water, and prey items) will be collected, as needed, to support the food web model that will be used to establish sediment preliminary remediation goals based on detected concentrations of chemicals in fish tissue.

The data collected from the RI/FS tasks above will be used to complete the baseline HHRA.

Sturgeon, adult spring Chinook, and adult Pacific lamprey were collected in the summer of 2003 through a cooperative effort of the ODHS, ATSDR, Oregon Department of Fish and Wildlife (ODFW), the City of Portland and EPA, Region 10. Although these data were not collected as part of the RI, they will be evaluated by the LWG and used in the HHRA. EPA and LWG will use a collaborative process for identifying data needs, data gaps, data uses and evaluations for salmonids, lamprey and sturgeon.

8.0 FEASIBILITY STUDY APPROACH

Though the primary goal of the RI and baseline risk assessment is to determine the areas that may require cleanup, the goal of the FS is to identify the appropriate remedy consistent with the nine CERCLA criteria. The RI and risk assessment are primarily information-gathering and evaluation tasks to understand existing conditions at the Site, while the FS is concerned primarily with identifying reasonable future actions that could be used to conduct a remedial action consistent with CERCLA requirements. Consequently, the FS relies greatly on the data collection and existing conditions description provided by the RI and risk assessment. However, some information gathering must also occur specifically for the FS so that various proposed actions can be evaluated for their potential to succeed (i.e., feasibility) in cleaning up the Site.

Because certain FS tasks are primarily concerned with collecting FS-specific information, they are described using an organization similar to that found in Section 7 for risk and chemical distribution/source information (a DQO style presentation). However, the portions of the FS that are concerned primarily with evaluating the outputs of the RI and risk assessment, as well as developing proposed actions, are described more generally as a series of data analysis and deliverable steps.

In the following sections, the overall FS process and major tasks are briefly described (Appendix A contains the detailed FS process). Key tasks are then described in more detail and, where appropriate, are presented in the DQO style of the previous section. Wherever possible, the information flow that will occur between RI, risk assessment, and major FS tasks is illustrated. However, because the FS essentially relies on all of the information generated by the previous studies, there may be specific pieces of information that will be used but are not specifically identified for a particular FS task. For example, bathymetry is essential to almost every FS task, but use of this information is not repeatedly identified throughout the text.

8.1 FS PROCESS AND MAJOR STEPS

The FS process can be understood in two basic ways that are illustrated in Figure 8-1:

- The sequence of evaluation tasks that will lead to a selected remedial alternative
- The information that will flow from the RI/risk assessment/FS data collection to major FS tasks.

The major tasks for performing the FS are described below.

Preliminary Planning Tasks. As a part of this Work Plan, several memoranda have been prepared to describe specific processes that are proposed to evaluate existing information or to help in planning of the FS (Appendix A, Attachments A1-A4):

- Development of preliminary RAOs
- Description of a proposed disposal facility siting process
- Identification of potential sources of capping materials
- Analysis of natural attenuation data gaps.

These memoranda generally lay out processes or information that will be of later use in the FS. How these proposed processes fit into the overall project are further described below and detailed in the Appendix A attachments.

RAOs. The FS must start with a description of the objectives of the remediation. These form the basis from which the success and effectiveness of proposed actions can be evaluated. This task determines the goals of the entire FS process. The RAO memorandum describes the Applicable or Relevant and Appropriate Requirements (ARARs) and To Be Considered (TBC) initiatives that will be used in determining an appropriate RAOs and a Site remedy. Compliance with ARARs is one of the CERCLA “threshold” criteria (the other being overall protection of human health and the environment) for evaluation of alternatives.

Treatability Studies. Treatment is one potential remedial alternative. In some cases, laboratory- or pilot-scale studies must be conducted to understand the feasibility of treatment technologies. This task involves determining the need for such studies and conducting these studies when and if they are needed.

Facility Siting Studies. Many remedial options include the removal of sediments and disposal or treatment at some other location. This task will identify potential disposal site and treatment locations that may need to be evaluated for the FS.

Natural Attenuation Studies. Natural attenuation is one type of remedial alternative that will require data collection on the physical and chemical systems of the river to understand its potential feasibility. This task includes both the data collection and data evaluations that will be conducted to determine the feasibility of this particular option.

Development, Screening, and Evaluation of Remedial Alternatives. This task involves the first step in identifying potential remedial alternatives for the Site. It will proceed in a series of remedial alternative development and evaluation steps that will rely on various types of data analysis including:

- Determination of SMAs and, for SMAs in which dredging is considered a potential remedial action, volumes of sediment requiring remediation

- Evaluation of remediation and disposal site engineering properties
- Analysis of the recontamination potential at remediated sites.

This step in the FS process follows EPA (1988) guidance on conducting FSs and includes evaluation of alternatives against the three screening criteria of effectiveness, cost, and feasibility as well as detailed evaluation of alternatives against the nine CERCLA evaluation criteria.

A preliminary list of remedial technologies that will be considered in the development of remedial alternatives has been developed and is presented in Appendix A, Attachment A1. In summary, the remedial technologies for sediments that will be considered in the development of remedial alternatives are:

- No Action
- Institutional Controls
- Natural Attenuation
- *In-situ* Containment (e.g., capping)
- *In-situ* Treatment
- Removal and Disposal (e.g., aquatic, nearshore, or upland confined disposal)
- Removal and Treatment

In addition, other remedial technologies that may apply to chemicals in fish tissue and/or water are discussed in Appendix A, Attachment A1.

FS Report. This report describes all of the above data collections, data evaluations, and remedial alternative development and evaluation steps. The purpose of this task is to present the recommended remedial alternatives to EPA and its partners for review and eventual agreement, and, finally, to assist in development of the ROD.

The following sections describe the methods and approach to each of these tasks in more detail.

8.2 REMEDIAL ACTION OBJECTIVES

Preliminary RAOs were developed for the project and are described in the Preliminary Draft Remedial Action Objectives Technical Memorandum (see Appendix A, Attachment A1). This section summarizes the preliminary RAOs defined in that technical memorandum. It should be noted that the technical memorandum also describes the process of how these preliminary RAOs were

determined. In general, the process closely followed CERCLA guidance (EPA 1988). RAOs provide a context for the FS and, when established early in preliminary form, help focus the FS toward effective remedial alternatives.

It is important to note the following specific definitions of terms used in the preliminary RAOs.

Reduce Risks. Lessening the unacceptable risks from chemicals by lowering their concentrations, mobility, bioavailability, toxicity, or exposure to receptors. The assessment endpoints used to define unacceptable risks are presented in detail in the ERA and HHRA approaches (Appendices C and D). In summary, the ERA endpoints are the survival, growth, and reproduction of relevant ecological receptors. For human health, the endpoints are carcinogenic and non-carcinogenic effects to people (using EPA's typical risk range for cancer risks of 1×10^{-4} to 1×10^{-6}). Use of the word "reduce" is not intended to imply that the risk reduction must occur through a decrease in chemical concentration in the matrix of interest.

Acceptable Levels. Risks posed by chemicals that are below unacceptable adverse risk or harm to either the ecological or human health receptors identified above using the assessment endpoints defined in the ERA and HHRA approaches (Appendices C and D, respectively). These risk levels will be eventually quantified through the baseline risk assessment.

The five preliminary RAOs listed in Section 6.1 all follow the specific requirements of RAOs in EPA (1988) guidance. The FS will consider "background" following EPA guidance (EPA 2002b) on the use of background in RI/FS evaluations and other relevant EPA Superfund guidance. The intent is that RAOs will not result in remedial action (or cleanup) levels that are below background levels, including anthropogenically caused background levels. This is consistent with EPA (2002b) guidance on consideration of background in risk management. Site-specific background levels will be identified in a future technical memorandum (see Section 6.3.2).

In addition to the RAOs the following general objectives (which are not RAOs) for the remedial action are considered important by the LWG.

- Promote remedial actions that do not limit current or planned waterway, municipal, commercial, industrial, recreational, or Tribal ceremonial uses.
- Promote remedial actions that are feasible for the physical system of the Willamette River.
- Integrate remedial actions with NRDA findings and restoration plans, where appropriate.

As detailed in the technical memorandum, RAOs will be developed and refined at the start of the formal FS (after Round 3 sampling) in coordination with EPA. An integral part of developing RAOs is considering ARARs. Appendix A, Attachment A1, reviews ARARs and TBCs that may be appropriate for use in this FS.

8.3 TREATABILITY STUDIES FOR SEDIMENTS

Treatability study tasks are described in detail in Appendix A. A summary is provided below.

8.3.1 Problem Description

Treatability studies provide information on the suitability of site-specific sediments or other matrices for treatment technologies and help to understand how various treatment technologies may or may not be viable for this specific site. Consistent with the SOW, if existing information is sufficient to determine suitable technologies and/or judge their appropriateness without treatability studies, treatability studies do not need to be conducted.

8.3.2 Decisions and Data Uses

Sufficient information must be available to compare, in a consistent manner, treatment technologies with all other technologies. If literature information is insufficient, treatability studies for specific technologies may be necessary. Two basic preliminary decisions must be made:

- Which treatment technologies are effective and cost-competitive (potentially suitable) as compared with other general response actions?
- For those potentially suitable technologies, would treatability studies be needed to determine the appropriateness of the technologies for this specific site?

8.3.3 Data Needs

To make the preliminary decisions, a literature survey of existing treatment technologies is needed. If this information is insufficient to compare, in a consistent manner, treatment technologies with other remedial alternatives, then treatability tests should be conducted.

8.3.4 Treatability Study Tasks

Per Section 8.1.1 of the SOW, the LWG will conduct a literature survey on existing sediment treatment methods. Information on performance, relative costs, applicability, removal efficiencies, operation and maintenance requirements, and implementability of candidate technologies will be compiled and evaluated.

Based on this review and data evaluation, the LWG will recommend to EPA in a technical memorandum (Treatability Study Literature Survey Technical Memorandum) whether treatment is a feasible and cost-effective general response action for sediments. If so, the specific types of treatment technologies likely to be feasible and cost-effective (and why) will be presented and discussed in a technical memorandum. Finally, the memorandum will indicate whether site-specific treatability studies are needed to further evaluate any of these technologies.

If a decision is made to perform treatability studies, the LWG will select in conjunction with EPA the type of treatability testing to use (e.g., bench vs. pilot). A brief technical memorandum (called a statement of work in the AOC and defined as the Evaluation of Treatability Studies Technical Memorandum) will be prepared by the LWG that lists the candidate technologies, identifies the scale at which they will be tested (pilot vs. bench), and lists available facilities/sites at which the testing can occur. Testing will occur on the basis of this memorandum.

As shown in Figure 8-1, the Literature Survey Technical Memorandum will be provided in time to refine general response actions (immediately after Round 3 sampling). If treatability tests are conducted, they will be completed in time for the refinement of alternatives step in the FS process.

8.4 FACILITY SITING STUDIES

This FS task is described in detail in Appendix A, Attachment A2, and is summarized here.

8.4.1 Problem Description

Sufficient information must be available on potential sites for sediment disposal to reasonably evaluate dredging or other removal remedial options. The actual availability, distance, and configuration of facility sites affect many aspects of the remedial alternative, including the major FS selection criteria of effectiveness, cost, and feasibility.

8.4.2 Decisions and Data Uses

Sufficient information must be available on disposal sites such that the removal option can be reasonably evaluated in the FS consistent with other alternatives. All

types of disposal sites are to be considered, such as aquatic, nearshore, upland, and currently operating landfills.

8.4.3 Data Needs

The locations, limitations, and general configurations of potential sites must be known. Where these are currently operating landfills, this would include tipping and other commercial fees as well as taxes.

8.4.4 Facility Siting Tasks

The following major steps to facility siting and disposal site identification are presented in Appendix A, Attachment A2:

1. Define the geographic limits of the study area to be considered for facility siting.
2. Estimate the volume of sediments that might be disposed based on Round 2 information available.
3. Evaluate the study area for sites of appropriate size (given Step 2 volume assumptions) and use preliminary screening criteria to create a preliminary inventory of sites.
4. Determine the specific volume and the chemical, physical, and geotechnical characteristics of the sediments to be disposed (information available after Round 3 sampling).
5. (Optional) Rescreen sites from Step 3 to create a refined site list, based on the information from Step 4 and any additional useful criteria that become evident from the information gathered in Step 4. (If Step 4 information is insufficient to further refine the site list, then this step will be skipped.)
6. Conduct a brief evaluation of each site on the refined list (or preliminary list of Step 5 is skipped) using CERCLA-based criteria to arrive at a final ranked list of potential sites.

This process will create a “menu” of options that can be used in remedial alternative development described below. In addition, Round 3 sampling may also include collection of engineering samples from prime candidate disposal locations prior to Step 4. This would allow further refinement of remedial alternatives involving disposal sites.

The facility siting process invokes some of the substantive requirements of certain ARARs, such as for consideration of in-water disposal, Section 404(b)(1) criteria should be considered during the selection and screening of the alternatives evaluation. For example, an in-water disposal option may not pass the 404(b)(1) alternatives

analysis if the only upland disposal site is a commercial landfill. Information and consideration of one or more on-site upland disposal sites in addition to a landfill may be required to fulfill 404 requirements. It is anticipated that early outreach on the proposed disposal site list for FS evaluation may be conducted to help understand the range of potential public opinion on the sites.

8.5 NATURAL ATTENUATION STUDIES

Appendix A, Attachment A4, describes natural attenuation studies in detail. This section summarizes those studies. The DQO process for natural attenuation is summarized in Table 8-1.

8.5.1 Problem Description

For natural attenuation to be evaluated as a potential remedial alternative for portions of the Site, it must be predicted whether the processes present at the Site are likely to cause natural attenuation to occur, and if so, how quickly that attenuation will progress. Because natural attenuation occurs through numerous physical, chemical, and biological processes, the most common method of predicting the potential for natural attenuation is through the use of computer models that require specific data inputs. Consequently, considerable information on natural systems at the Site must be collected and evaluated in time for the evaluation of this alternative in the FS.

8.5.2 Decisions and Data Uses

It must be determined whether there is a reasonable probability that natural attenuation is a feasible alternative for any portions of the Site. Data must be collected on the physical/chemical system to allow adequate modeling of the Site.

8.5.3 Data Needs

Data needs are determined by the specific computer models proposed to predict the potential for natural attenuation. The selection of models is described in Appendix A, Attachment A4. Table 8-2 summarizes those data needs based on the models selected in Appendix A. The steps referred to in Table 8-2 are outlined below.

8.5.4 Data Collection and Evaluation Tasks

A tiered approach to natural attenuation studies will be followed to focus resources on the areas of the site where natural attenuation may be a plausible alternative. The following three-step process is proposed:

- **Step 1.** Identify areas that have basic processes that are potentially suitable for natural attenuation based on information already available for the river system.
- **Step 2.** Conduct select sampling (in Round 2) within a few areas that appear characteristic of the range of potential natural attenuation processes at the Site and simple probabilistic modeling. Eliminate from future evaluations the types of areas that have a low probability of having processes that support natural attenuation.
- **Step 3.** Conduct detailed sampling (in Round 3) and modeling in SMAs that appear to have suitable processes for natural attenuation (based on Step 2 results) to determine viability and rate of natural attenuation.

Step 1 identifies areas of the river that potentially have natural attenuation processes that are characteristic of types or river conditions (e.g., embayments, backwaters, eddies, slips, otherwise protected areas). These areas will be reviewed, and particular sites will be selected for sampling in Step 2 that are representative of the range of overall site characteristics that may be conducive to natural attenuation. These characteristic areas do not represent proposals for natural attenuation, but will help focus future natural attenuation sampling in Round 3. Based on Round 3 information, modeling will be conducted that will identify specific areas where natural attenuation may be a viable remedial alternative. The data collection proposed to support these steps is summarized in Table 8-3. Information for some parameters will be obtained from either literature values and/or other studies conducted for this RI/FS, including STA® results and hydrodynamic modeling results. Information on groundwater conditions will be obtained through LWG lead groundwater studies proposed elsewhere in this Work Plan, as well as groundwater data collected by individual parties as a part of DEQ-directed upland cleanup efforts.

The information from Round 3 natural attenuation sampling and subsequent modeling will be used to define areas that may be suitable for natural attenuation as a remedial alternative.

8.6 SEDIMENT MANAGEMENT AREAS AND VOLUMES

The first step in the FS is defining areas and volumes of sediments where remediation will be necessary. This includes both area-specific risks and sediments that cause risks through site-wide processes such as bioaccumulation of chemicals.

8.6.1 Problem Description

At the conclusion of the RI and baseline risk assessment process, the nature and extent of sediment contamination and risks (including site-wide risks) will be understood in sufficient detail to define SMAs and volumes of sediments potentially posing risks. SMAs are a tool for defining sediment regions within the Site that can be discretely considered for development of remedial alternatives. The development of SMAs does not preclude the evaluation and inclusion of site-wide risks in the definition of sediments requiring cleanup or development of remedial technologies for those site-wide risks. The FS will develop comprehensive alternatives that evaluate natural attenuation, capping, dredging and other options for these areas. Therefore, the sampling completed at the end of Round 2 should provide sufficient types and amounts of information to preliminarily define these areas. Additional data will likely be collected in Round 3 to further refine some SMAs and sediment volumes, and generate data needed to evaluate remedial alternatives in the FS. In other cases, refinement of SMAs can be conducted after the ROD in the RD/RA phase of the project.

8.6.2 Decisions and Data Uses

The primary objective of the FS is to identify a menu of remedial options for SMAs within the Site. These remedial options could apply to SMAs singly, in combination, or to the entire site. Because for many types of risks, the level of risk will vary between regions of the Site, the Site will be broken down into a “mosaic” of discrete areas (i.e., SMAs) where remedial options can be evaluated and applied, leading to the development of remedial alternatives. The definition of this mosaic of SMAs is the primary decision required.

The decision requires input from a wide variety of data types (discussed in the next section). These data will be used define the mosaic of SMAs that will be used in the FS.

8.6.3 Data Needs

To delineate SMAs, the following types of evaluations based on site data are needed:

- A delineation of areas posing unacceptable risks for ecological and human health receptors both within regions of the site and site-wide
- A categorization of risks within areas that pose unacceptable risks (e.g., areas that pose a principal threat and/or “high” risk versus relatively “low” risk areas)
- A categorization of site-wide risks and the areas that contribute to those site-wide risks

- Delineation of sediment volumes (vertical and horizontal extent) that pose unacceptable risks, where deeper sediments may pose potential future risks
- Delineation of sediment volumes sufficient for evaluation of remedial alternatives in the FS (particularly for areas where dredging is likely due to navigation, water dependent, or other similar uses)
- Identification of physical environments (e.g., erosive areas, deposition areas, nearshore benches, navigation channels, depressions)
- Identification of habitat types and areas of special habitat significance
- Identification of river and shoreline land uses that affect remedial alternatives (e.g., navigation channels, current and future marine facilities, proposed shoreline developments)
- Identification of areas that may be impacted by ongoing sources (upstream and/or upland).

The information that will support these evaluations includes the following:

- **Ecological Risk Areas:** based on the results of the ERA, which will also provide information on relative risk to determine principal threat areas as well as areas of relatively “high” vs. “low” risk. Site-wide ecological risks will also be included.
- **Human Health Risk Areas:** based on the results of the HHRA, which will also provide information on relative risk to determine principal threat areas as well as areas of relatively “high” vs. “low” risk. Site-wide human health risks will also be included
- **Volumes:** surface and subsurface sediment chemistry
- **Physical Environment:** SPI, STA[®], grain size, low- and high-flow bathymetry, radioisotope cores, sediment trap data, preliminary natural attenuation modeling results, hydrodynamic/sediment transport modeling results, and site geography
- **Habitat Types:** based on the results of the ERA
- **River Uses:** navigation channel limits, aerial photographs, property maps, and information from property owners, land use and marine master planning documents.

- **Ongoing Sources:** in-river surface sediment, Transition Zone water (if collected), and surface water chemistry, data collected by DEQ through upland cleanup actions, sediment trap data, and subsurface sediment chemistry.

8.6.4 SMA and Volume Tasks

The FS tasks needed to define SMAs and volumes are described below.

Review Round 2 Data Collection for Preliminary SMAs

The preliminary risk assessment results (based on data for tissue chemistry, surface sediment chemistry, subsurface sediment chemistry, beach sediment chemistry, bioassays, and water chemistry), bathymetry, SPI, STA[®], and grain size, as well as hydrodynamic modeling, have been or will be collected in Rounds 1 and 2. These tasks are described in detail in Section 7. How those tasks will be adapted to fulfill the SMA data needs is described below.

The biased surface and subsurface sediment sampling approaches proposed for site characterization and risk tasks for Round 2 include samples that target locations where specific information is desired, such as filling potential spatial data gaps, determining areas where risk pathways or receptors exist, and understanding source effects from potential upland sources. Altogether, these samples cover a wide range of general site conditions within the ISA, including nearshore areas, deeper areas, the navigation channels, maintenance dredge areas, depressions, benches, potential deposition and scour areas, and in and around slips and features like Swan Island. Because of this wide coverage, this information can be used to define preliminary SMAs at the end of Round 2 sampling that account for unacceptable risks including site-wide risks and physical components of the Site.

As described in the natural attenuation task above, preliminary information will also be available for radioisotope cores at the end of Round 2. This information will help to define potential deposition areas of the Site. However, it will not be essential to the development of preliminary SMAs after Round 2. As described above, preliminary hydrodynamic/sediment transport and natural attenuation modeling tasks will be completed by the end of Round 2 data collection. This information will be useful in describing the range of physical environments present at the Site, and will be input directly into a preliminary definition of SMAs that account for sediment depositional, dynamic equilibrium, and erosive areas.

Information has been gathered on the general existing conditions of the Site, including site geography, navigation channel limits, aerial photographs, and property maps that can be input directly into SMA definition. Information has also been gathered on the status of DEQ investigations of potential sources within the ISA. Finally, the nature and extent of contaminants in water and sediment (including upland groundwater and Transition Zone information) will provide additional

information that will also be factored into SMA definition relative to potential ongoing sources and potential background levels of chemicals.

The primary additional tasks that are not part of other efforts and have been identified to help define SMAs are:

- Obtain periodic updates of DEQ-gathered information on sources through the course of Round 2 so that these can be input into the preliminary SMAs
- Obtain information from land owners about potential future uses of shorelines and waterways.

This second task will be conducted by interviewing major landowners along the shoreline, reviewing both dredging records and existing maintenance dredging permits, reviewing the City of Portland Comprehensive Plan and Port of Portland marine master plan, to determine areas that are or will be routinely maintained for navigation. It must be realized that in many cases landowners may either be uncertain about potential future uses and/or unwilling to provide this information for commercial reasons. Consequently, where information gaps exist, it will be assumed for SMA definition that existing uses would be maintained at shoreline sites.

Define Preliminary SMAs and Volumes

There is no well-defined guidance or process for defining SMAs that applies to all situations. SMA development will be an iterative process that considers how areas of risks (including site-wide risks), volumes of sediments, physical environments, biological environments, and site uses overlap. It will primarily be a mapping exercise. Sediment areas that define unacceptable ecological risks, unacceptable human health risks, physical environments (e.g., erosive, depositional, benches, depressions, and landforms), and site uses will be separately mapped. This includes mapping areas of discreet risk as well as sediment or sources that contribute to site-wide ecological or human health risks. Where possible, the individual locations (such as surface sediment stations) that are used to define the areas will also be shown on the maps. These separate layers and sampling locations will be overlaid to see how they interact and group. Generally, SMAs will be defined to minimize the number of risk, physical, and site use boundaries that are crossed by each SMA while keeping the SMAs at sizes that are reasonable to evaluate from an engineering perspective. Areas of relatively high risk (i.e., principal threat areas or “hot spots”) will also be considered in developing SMAs. Principal threat areas may either be parts of SMAs or uniquely separate SMAs. The general magnitude of risks as described in the ERA and HHRA documents will also be considered using information such as hazard quotients, risk probabilities, and other risk estimates. The identification of principal threat areas will assist in the evaluation of remedial alternatives that may better address areas of particularly concentrated or toxic chemicals that differ in character from other SMAs or the Site in general.

It should be noted that risks may be defined either on an area basis either regionally or over the entire site or an extrapolation of areas from one or more point samples. Where risks are based on point samples that are extrapolated to areas, spatial or statistical procedures may be used to define the areas of risks. Where risks are available on an area-weighted average basis (e.g., over a home range or a swimming beach or the entire site, where appropriate for the risk pathway involved), these areas will be used to define the risk area component of the overlay. In some cases, such as risks involving bioaccumulation pathways, the area posing risk may be a large portion or even the entire site. This situation will also be mapped for the appropriate chemicals and pathways.

Once a preliminary SMA map is defined, it will be examined to determine where SMA boundaries are based on relatively limited data sets. If it appears that further definition of these boundaries is needed in order to develop a reasonable set of remedial alternatives for evaluation in the FS, then these areas may be targeted for additional sampling in Round 3. If this information is not critical to the FS, refinement of SMA boundaries may be left to the RD/RA phase after the ROD.

Refine SMAs After Round 3 Data Collection

It is anticipated that after Round 3 data collection, the SMAs will be refined. The following information will likely be available at that time:

- Additional natural attenuation sampling (water samples, sediment traps, radioisotope cores) and modeling results
- Additional subsurface sediment cores intended to define volumes of sediment posing risks.

These data will be used to refine SMAs relative to physical system types (e.g., erosion or deposition areas), as well as areas that may be specifically suited for one or more remedial types (e.g., natural attenuation).

Subsurface coring in Round 3 will be conducted to specifically determine the depth of contamination in SMAs that appear to be potential candidates for dredging (either through remedial design or for navigational purposes) or in areas that have a potential to erode over time or during major flood events. This information may also be gathered for principal threat areas. Chemical levels in subsurface sediments would be compared to risk-based levels established in the baseline risk assessments to determine volumes of impacted sediments.

8.7 RECONTAMINATION POTENTIAL

8.7.1 Problem Description

To the extent practicable, ongoing sources should be controlled before remedial actions are implemented so that recently cleaned areas are not re-impacted by the same or other ongoing sources. This will be accomplished by performing the following tasks:

1. Developing and understanding of source processes through existing information (as reviewed in Section 3)
2. Developing a conceptual site model of ongoing sources that could affect the river (as reviewed in Section 5.1.1)
3. Collecting data to understand ongoing sources (as reviewed in Section 7.2)
4. Obtaining and reviewing data from DEQ on upland sources that are gathered as a part of various upland site investigations
5. Referring to DEQ-identified ongoing sources that appear to be impacting the river for new or further source control implementation at those sites
6. Identifying in-river sediment sources that may be adversely affecting downstream areas for cleanup under the FS alternatives.

This approach will include evaluating all types of potential sources discussed in Section 3, such as outfall discharges, groundwater discharges, spills, bank erosion, chemical leaching from surfaces, atmospheric deposition, and water and sediment transport within the river.

The above tasks will be undertaken by the LWG and/or referred to DEQ for additional action (as noted above) and will be the primary methods for identifying and controlling sources early in the cleanup process. It is important to note that the recontamination evaluation discussed in this section is not the main method of source control, which is regulated by DEQ for upland sites. Rather, the recontamination evaluation serves as a later verification that sources are suitably controlled for remediation to proceed. If this evaluation indicates sources may not be suitably controlled, then this information will be referred to DEQ for additional investigation of upland sources before actual construction of in-water remediation could commence.

Once sources are controlled to the extent practicable, a method is needed to assess whether recontamination may occur after construction of in-water cleanup actions. This recontamination evaluation will be undertaken after identifiable sources have been controlled or are being controlled, but before completion of the FS.

The evaluation of potential recontamination after primary source controls depends on whether concentrations from various sources stay at post-source control levels

established through the above efforts and the effect of these concentrations on future cleanup actions, and if the cleaned up areas stay clean. If either of these conditions are not expected to be met, further source controls should be implemented prior to construction of the cleanup actions. Implementation of additional source controls is expected to be carried out by upland property owners with direction by DEQ. In-water sources will be controlled through the remedial actions identified in the FS process.

8.7.2 Decisions and Data Uses

As noted above, a decision must be made whether it is acceptable to proceed with remedial actions given the number, type, and concentration of sources present at the completion of the FS. Data needed are described below, and would be used in predictive modeling inputs to determine the potential for recontamination under various remedial alternatives. The RI will collect information on potential effects of ongoing sources to the river waters and sediments. This information will be referred to DEQ for further source investigations and controls as appropriate.

It is important to note that comparison of source levels to criteria or risk-based levels may be uninformative to understand the potential for recontamination and is probably an unacceptably simple approach. For example, it may be known that an outfall periodically exceeds water quality criteria, but this knowledge, by itself, does not indicate whether such discharges might cause settling of chemical constituents to the riverbed at concentrations that pose sediment-related risks.

8.7.3 Data Needs

Assuming that some type of predictive modeling is needed, data needs are determined by the model input requirements. In addition to these specific inputs, it is necessary to understand the general presence and location of potential upland sources along the riverbanks. Further, it is necessary to have a general understanding of the levels of chemicals and sediments that move into the ISA from upstream and downstream. This information will be useful to determine the location to run the model and at what spatial density.

The same natural attenuation model discussed above for Round 3 is also proposed for use to assess the potential for recontamination. Natural attenuation models predict changes in surface sediment chemistry given present understanding of water column, subsurface sediment, and groundwater sources. These models can also be used to predict changes in sediment chemistry that will occur after, for example, dredging or capping.

The data needs are the same as those described for natural attenuation. Given information on incoming sediment concentrations (see Natural Attenuation Studies section above), these models can be used to predict how the post-remediation cap

surface or dredged surface chemical concentrations will change over time. If the post-remediation sediment surface reaches unacceptably high concentrations in the modeling, this provides valuable information that additional source controls need to be considered before such a remedial action should be undertaken. In addition, sufficient data must be available on the known or suspected sources so that where and at what density to model can be determined.

8.7.4 Recontamination Evaluation Tasks

The data collected for natural attenuation (as detailed in Appendix A, Attachment A4) in Round 3 will provide the basic inputs for the recontamination model, including:

- Grain size
- Surface chemical concentrations, water content, specific gravity
- Hydrodynamic modeling
- Sedimentation rates from radioisotope cores and/or sediment traps
- Settling sediment chemical concentrations from water column samples or sediment traps
- Mixed layer depth and mixing rate.

The modeling approach will use a one-dimensional fate and transport model that focuses on the sediment bed. As described in Appendix A, Attachment 4, the Boudreau model is currently proposed, but will be described in greater detail in a modeling technical memorandum for EPA review and approval. The model predicts changes in chemical concentrations in the sediment bed given various chemical inputs (such as settling sediment) and outputs (such as diffusion and biodegradation). The data needs described above would be the primary information used to estimate these inputs and outputs. Thus, a future condition can be assumed (such as clean sediment surface after remediation) and existing and/or predictions of future chemical conditions of sources and the water column can be used to determine whether that clean sediment bed will recontaminate to unacceptable levels. Because the model is one-dimensional, it can be applied discreetly to various locations throughout the site to understand how recontamination potential might vary spatially.

Also, where groundwater is a known or suspected source (and/or flow of clean groundwater through impacted subsurface sediments is suspected), information on these sources and subsurface concentrations would be needed. This information may be available through LWG efforts, DEQ-directed efforts at individual upland sites, or a combination of both.

If the appropriate data are not available for any of these parameters, then the LWG will work with EPA to identify a process and method for obtaining the data, which may include: LWG data collection, data collection by individual upland site property owners, and/or data collection directed by DEQ on or near upland properties. However, Round 2 data collection described in Sections 6, 7.2, and 8.5 is intended to provide the vast majority of these data.

Where to model and at what density will be determined by available source effect information, which by Round 3 will likely include:

- LWG efforts to understand source effects to river waters and sediments (see Section 7.2)
- DEQ efforts to identify and control sources at individual sites
- EPA efforts regarding control of upstream sources.

It is difficult to predict the state of knowledge on all these sources at the time that Round 3 starts. Consequently, an exact program of sampling and analysis cannot be described at this time. However, the concept is to review the status and amount of source effect information and fill in data gaps, as needed, to provide sufficient information for recontamination modeling. This may include further sampling of sources that appear to be substantially contributing to in-water concentrations of chemicals of concern. While sampling of particular sources may be important to fill data gaps, direct measurements of in-water concentrations of chemicals is critical to making evaluations of recontamination potential. This might also include such studies as sediment traps near outfalls, water column samples near suspected sources, subsurface chemistry near sources, and sampling water quality in the Transition Zone near known or suspected groundwater sources. Again, any such data gaps will be filled in Round 3.

Although modeling summarized here and described more in Appendix A, Attachment 4, is intended to be the primary method of predicting potential future recontamination, other methods of data collection will be considered that might help directly verify recontamination potential. These may include characterization of potential areas that may erode and allow transport of chemicals downstream. This could also include examination of historical chemical concentration profiles in downstream areas with comparison to information on existing water column inputs. These and other data collection methods could be used to understand variations in potential long-term inputs in the model so that conditions sampled during Round 3 are not erroneously assumed to apply to all future conditions.

8.8 DEVELOPMENT, SCREENING, EVALUATION, AND SELECTION OF REMEDIAL ALTERNATIVES

The overall steps to the evaluation and selection of remedial alternatives is shown in Figure 8-1. As noted in Section 8.1, a range of remedial alternatives will be evaluated, including no action, institutional controls, *in-situ* containment, *in-situ* treatment, removal and disposal, removal and treatment. The steps of the FS process are generally prescribed by the SOW, and, to a lesser extent, by CERCLA guidance (EPA 1988) (see Appendix A). As outlined in Appendix A, the FS process results in series of alternative development reports that will be submitted to EPA (Figure 8-1). Appendix A currently describes this approach consistent with the linear process outlined in the SOW.

Wherever possible, some of the deliverables will be submitted simultaneously rather than in sequence. The most likely place to expedite the schedule is by simultaneous submittal of the following documents:

- Identify and Screen Remedial Technologies, Assemble and Document Alternatives, Screening Evaluation of Alternatives, and Alternatives Development and Screening summary reports
- Detailed Comparison of Alternatives Report and the Feasibility Study Report.

The process will be streamlined wherever possible, and the LWG is open to alternate ways of accelerating the above reports. Once agreement has been reached with EPA on how to schedule the FS deliverables, Appendix A will be revised to reflect this process.

In addition to the data needs identified by the previous tasks, some additional data on engineering properties of sediments and/or disposal sites in various areas may be needed in Round 3. These will generally include analyses like grain size, Atterberg limits, consolidation tests, and shear tests. This information will be directly input into the evaluation of alternatives.

It should also be noted that this is the step in the FS process where remedial alternatives are screened and evaluated in detail per EPA (1998) guidance. This includes screening alternatives against the three primary criteria of effectiveness, cost, and feasibility, as well as detailed evaluation of alternatives against the nine CERLCA evaluation criteria of:

Threshold Factors:

- Overall protection of human health and the environment
- Compliance with ARARs

Primary Balancing Factors:

- Long-term effectiveness and permanence
- Reduction of toxicity, mobility, and volume through treatment
- Short-term effectiveness
- Implementability
- Cost

Modifying Considerations:

- State acceptance
- Community acceptance.

For compliance of ARARs, a list of potential ARARs for the project have been compiled in Appendix A, Attachment 1. This includes regulations that address such potentially important issues as flooding and the affects of in-water work on aquatic resources. Thus, the remedial alternatives will need to have some early assessment of the magnitude of mitigation and its cost to run through the nine criteria evaluation.

8.9 FS REPORT

The FS report is the final deliverable under the AOC and describes the recommendation of the alternatives evaluation process and documents all the FS data collection, data evaluation, modeling, and engineering tasks. Appendix A describes the FS report in more detail. The purpose of this task is to present the recommended remedial alternatives to EPA and partners for review and approval, and finally, to assist in development of the proposed plan and ROD.

9.0 PROJECT MANAGEMENT PLAN

This project management plan describes the roles and qualifications of key personnel conducting the RI/FS for the Site. This plan also describes how the LWG will communicate and coordinate, both with EPA and among the LWG members (including the consultant team), the decision-making process and key decision points, project reporting requirements, schedule and schedule control, and cost control. A separate data management plan is provided in Appendix G.

9.1 PROJECT ROLES AND RESPONSIBILITIES

The overall project organization and major task responsibilities are illustrated in Figure 9-1. The RI/FS is being conducted by the LWG under the oversight of EPA, Region 10. Members of the LWG who are signatories on the AOC include:

- ATOFINA Chemicals, Inc.
- Chevron USA Inc.
- City of Portland
- Gunderson, Inc.
- Northwest Natural
- Oregon Steel Mills, Inc.
- Port of Portland
- Time Oil Co.
- ConocoPhillips Company (successor to Tosco Corporation)
- Union Pacific Railroad.

9.1.1 Agency Roles and Responsibilities

As described in the AOC and associated SOW, EPA is the lead agency for all in-water RI/FS activities and will oversee LWG activities associated with implementing the RI/FS. EPA will coordinate all Trustee, Tribe, and State of Oregon input with respect to development of technical and decision documents. At the completion of the RI/FS, EPA will select the remedy to be implemented at the Site. EPA will also oversee a public involvement process with input from the LWG. As stated in the SOW, EPA is the supporting agency for upland cleanup and source control activities. The site managers for EPA are currently Mr. Chip Humphrey and Ms. Tara Martich. A formal replacement for the EPA project manager designated in the AOC has not been made. All correspondence with EPA shall be sent to these individuals at the addresses listed in Table 9-1.

DEQ is the lead agency responsible for all upland cleanups and source control activities associated with the Site. In addition, DEQ is the support agency for the in-water RI/FS and will coordinate upland cleanup activities and decision-making with EPA. The lead contact for DEQ is Mr. Jim Anderson; his contact information is found in Table 9-1.

Trustee agencies and Tribes will review technical documents prepared under this AOC and will participate in technical meetings. Contact information for trustee and Tribal organizations is also presented in Table 9-1.

9.1.2 LWG Roles and Responsibilities

The LWG will conduct an RI/FS and report the results in documents according to the AOC and referenced EPA guidance. EPA has directed that negotiations on implementation of Early Actions be conducted outside the process covered by this Work Plan. Early Actions will be conducted under DEQ or EPA authority separate from work being performed under the AOC.

The LWG is co-chaired by Mr. Jim McKenna of the Port of Portland and Mr. Bob Wyatt of Northwest Natural. All official contact with the LWG should be through these co-chairs (see Table 9-1).

9.1.3 Consultant Team Roles and Responsibilities

The LWG consultant team is responsible for implementation of the RI/FS tasks at the direction and oversight of the LWG. Each team member is responsible for major RI/FS tasks reflecting their firm's areas of expertise. In turn, each firm will support other consultant team members where appropriate. Mr. Keith Pine of Integral Consulting, Inc. [formerly Striplin Environmental Associates (SEA)] will coordinate the RI/FS consultant activities and develop and implement the RI with support from Mr. Gene Revelas. Dr. Bill Williams and Ms. Laura Kennedy of Kennedy/Jenks Consultants are responsible for conducting the human health risk evaluation. Dr. Mike Johns and Ms. Lisa Saban of Windward Environmental will conduct the evaluation of ecological risks. Mr. Walt Burt of Groundwater Solutions will coordinate the groundwater tasks. Mr. Tom Schadt and Mr. Carl Stivers of Anchor Environmental will be responsible for the FS. Ms. Barbara Smith of Harris and Smith Public Affairs will provide public participation support for the project. Dr. David Ellis of Archeological Investigations Northwest will be responsible for coordinating the cultural resources work.

The consultant team effort will be augmented by use of experts in specific aspects of the RI/FS. These experts will be identified in work plans for specific sampling and analysis tasks.

Qualifications of the project managers for the consultant team are summarized below.

Mr. Keith Pine, a managing scientist with Integral Consulting, will manage the RI and coordinate the overall RI/FS efforts. In this role, he will oversee the RI technical work, participate in LWG strategic planning and agency negotiations, and coordinate RI/FS activities with the LWG consultant team and other technical consultants. Mr. Pine has 18 years experience in managing and providing oversight of sediment, soil, and groundwater investigations and cleanups at dozens of CERCLA, RCRA, and brownfields sites in the Pacific Northwest. An Oregon-registered geologist, he has managed multimedia RI/FS and RCRA facility investigations at several large facilities including an aerospace industrial site along the Lower Duwamish Waterway (Seattle), Frontier Hard Chrome (Vancouver), and Northwest Pipe and Casing (Clackamas).

Mr. Gene Revelas, a managing scientist at Integral Consulting, will provide assistance to Keith Pine in overall coordination of the RI/FS efforts and will also be the project's sampling and analysis coordinator. In these roles, he will assist in the coordination of RI/FS activities among the LWG consultant team and will oversee the efforts of Integral's field, laboratory coordination, and data analysis and evaluation project staff. Mr. Revelas has 18 years of technical and project management experience in the interpretation and regulatory use of aquatic environmental data with an emphasis on contaminated sediment site evaluations, dredged material characterizations, and open-water disposal site monitoring. He is an expert in the use of sediment-profile imaging for benthic habitat quality mapping and assessment. Mr. Revelas has directed sediment collection and data evaluation programs at complex contaminated sediment sites such as Hylebos Waterway in Commencement Bay (Tacoma) and the East Waterway in Seattle.

Dr. Bill Williams, a senior toxicologist and project manager at Kennedy/Jenks Consultants, will have primary responsibility for the human health risk assessment. Dr. Williams has over 19 years of experience conducting human health and ecological risk assessments. He has been instrumental in the development of new concepts to define cleanup strategies at contaminated sites, especially the conception and development of site-specific protective concentration levels. Protection concentration levels extend the results of risk assessments to bridge the gap between risk estimates and engineering cleanup strategies.

Ms. Laura Kennedy is a toxicologist and risk assessor at Kennedy/Jenks. Her experience in environmental consulting includes human health, ecological, and predictive risk assessments. She has conducted numerous risk assessments of industrial and residential sites and freshwater and riverine areas for both public and private sector clients. Recently, Ms. Kennedy conducted a series of human health and ecological risk assessments as components of voluntary cleanup actions. The risk assessments evaluated potential exposure to chemicals, including metals, PAHs, and PCBs in soil, water, and sediments.

Dr. Michael Johns, a principal of Windward Environmental, LLC, will serve as the ecological risk assessment manager. Dr. Johns is an aquatic scientist specializing in aquatic ecological risk assessments, particularly those associated with contaminated sediment. The emphasis of his 25 years of professional experience has been on the effects of toxic pollutants on aquatic organisms. Dr. Johns has managed RI/FS, NRDA, and other large multitask, multidisciplinary environmental investigations. His recent responsibilities include the Lower Duwamish Waterway RI/FS (Seattle), the East Waterway RI/FS (Seattle), the Grand Calumet River NRDA (Indiana), the Calcasieu Estuary Combined RI/FS and NRDA (Louisiana), and two Supplementary RIs at the Harbor Island Superfund Site in Seattle. Dr. Johns is a recognized expert on the use of bioassessment techniques to evaluate sediment contamination.

Ms. Lisa Saban, a senior scientist at Windward Environmental, LLC, will serve as Dr. John's ecological risk assessment project manager. Ms. Saban has served as a project manager or lead ecological risk assessor for numerous complex ERAs and sediment investigations over the last 12 years. She has managed and conducted environmental studies on the local, national, and international level, for both private and public sector clients. She has extensive experience negotiating in client-stakeholder interactions, managing complex ERAs, NRDA and injury evaluations, and directing oversight and review of sediment and water quality studies. She has been involved in numerous stakeholder groups as a lead sediment specialist and ecological risk assessor.

Mr. Walter Burt, a principal hydrogeologist at Groundwater Solutions, Inc., will serve as the technical lead for groundwater-related issues. Mr. Burt is a hydrogeologist with over 13 years of experience in conducting hydrogeologic studies in the Pacific Northwest. Much of his focus has been on groundwater characterization, groundwater supply, and contaminant fate- and transport-related projects in the lower Willamette Valley and Portland areas. Recent projects include site and regional hydrogeologic investigations involving assessment of groundwater/surface water interactions along the lower Willamette and Columbia rivers for construction, water supply, and contaminant transport and remediation purposes. He recently served as technical lead for the environmental oversight consultant team for the Willamette River West Side CSO project, project manager for the Phase 2 Deep Aquifer Yield Numerical Flow Model of the Portland Basin, and senior consultant to the Portland Water Bureau for groundwater technical services on the Columbia South Shore Wellfield.

Mr. Tom Schadt, a senior aquatic scientist and principal at Anchor Environmental, has 20 years experience in environmental consulting, including nationwide experience with sediment remediation. Mr. Schadt's major area of focus is shoreline redevelopment and cleanup projects, and investigation of water and sediment quality and biological effects. His sediment project experience includes CERCLA, state-led, and voluntary action sites. Much of his project management experience is with sediment management issues, including sediment characterization, FS development,

cleanup design, long-term monitoring, and NRDAs. Tom has participated in sediment cleanup projects in both freshwater and marine environments, including rivers, lakes, bayous, estuaries, and bays.

Mr. Carl Stivers, a senior aquatic scientist at Anchor Environmental, has 15 years of consulting experience in sediment and water quality investigations. Past projects have included water quality impact evaluation, contaminated sediment investigation and remediation, and dredge sediment investigations. Mr. Stivers specializes in the management of complex environmental investigations particularly for sediment-related projects. Mr. Stivers has managed large-scale sediment remediation, water quality, and dredge disposal projects covering a wide range of sediment and water quality issues, including dredge and disposal impacts, sediment chemistry and toxicology, oceanographic studies, sediment risk assessments, benthic ecology, habitat restoration, NRDAs, chemical fate and transport modeling, sediment disposal site evaluation, and disposal suitability testing.

Ms. Barbara Smith is vice president and partner at Harris and Smith Public Affairs. She has more than 22 years of experience in journalism, government, and public affairs. Her work in environmental communications involves dozens of National Priorities List (NPL), Model Toxics Control Act (MTCA), Resource Conservation & Recovery Act (RCRA), Temporary Storage Depot, and Voluntary Cleanup Program sites, specializing in working with multi-PRP groups. She has facilitated several community advisory groups, participated in organizing local communities on behalf of site-specific communications, and has spoken on risk communication and environmental public involvement at many Pacific Northwest and national symposia. Harris and Smith Public Affairs has represented public and private sector clients throughout the Northwest from its Seattle-based office for more than 15 years.

Mr. David Ellis, M.P.A., a senior archaeologist at Archeological Investigations Northwest (AINW), will coordinate the cultural resources analysis. Mr. Ellis has directed cultural resource studies in the Portland area since 1976. He has been with AINW since 1990, serving as project manager for most AINW projects in the Portland area. Mr. Ellis has also served since 1992 as project manager for AINW's ethnographic and traditional cultural property studies. The latter experience included regular and frequent consultations and meetings with Tribal representatives. Mr. Ellis will supervise records search and data-gathering efforts, and represent AINW in team meetings and meetings with agencies and Tribes as needed. He will also be available for assistance and advice on Tribal coordination and consultation efforts.

9.2 COMMUNICATION AND COORDINATION

The complexity and duration of this project require a high level of organization and options for communications between EPA, EPA's partners, and the LWG, and among

the members of each of those parties. In recognition of this complexity, several communications tools have been developed.

9.2.1 Shared Server

A collaborative web site has been established that allows selective access to project information, documents, and data. This web site is available to EPA, supporting agencies, members of the LWG and their respective consultants, and the RI/FS consultant team. Access requires a current web browser and an Internet connection, and access to the site is controlled via password.

Once users log in, the web site is organized into a series of tabular pages that provide viewable and downloadable announcements, the current calendar for project meetings, a user directory and contact list, and copies of the draft and final technical or decision documents. Validated data, maps, photos, and other information will also be made available on the web site. Tips for site use and information about changes to the site are posted on the home page. A search function is available to facilitate use of the site. Links to EPA and DEQ project web sites are also provided.

9.2.2 Meetings

In addition to electronic communications via the project web site, EPA and LWG technical and project management representatives meet on a regular basis, with the frequency of meetings depending on current project activities. Agenda are discussed and agreed upon in advance of each meeting. Either party can request a meeting or conference call to resolve specific issues in advance of scheduled meetings.

Additional technical subgroup meetings between agency technical experts and managers and members of the consultant team and LWG are also used to foster additional discussion or develop details for an aspect of the RI/FS. As an example, the consultant team members in charge of the risk assessments met with EPA's toxicologists and risk assessors to discuss the risk assessment approach during preparation of the June 2002 RI/FS Work Plan. Similarly, technical subgroup meetings for groundwater, nature and extent, Early Actions, HHRA, and ERA have been conducted between agency technical experts and managers and members of the consultant team and LWG to facilitate resolution of issues and development of this Work Plan. Decisions on documents to be submitted to EPA or on how such documents should be drafted will only be made at meetings attended by LWG and EPA project managers.

9.3 DECISION-MAKING PROCESS

9.3.1 LWG Decision-making Process

The LWG will review data and information generated through implementation of this Work Plan consistent with the DQOs identified or refined throughout the RI/FS. The LWG consultant team will assist the LWG in interpretation of the data and information, and will make recommendations to the LWG for future RI/FS tasks or work products. The LWG will submit to EPA written recommendations regarding future RI/FS efforts.

9.3.2 EPA/DEQ/LWG Decision-making Process

Project decision-making is a cooperative process involving key technical and management staff from EPA, DEQ, and the LWG. Through frequent technical and management meetings, technical issues are discussed and evaluated, with the objective of reaching consensus on decisions.

EPA, DEQ, and the LWG hold regular project management meetings to discuss the agencies' technical and policy issues. These informal meetings provide an opportunity for the agencies and the LWG to raise issues pertaining to any aspect of the RI/FS and to strategize how best to address the issues. Agency project managers and members of the LWG project management team attend the project management meetings.

EPA and the LWG also have periodic formal technical meetings to discuss specific technical issues. The objective of these meetings varies. Some meetings are informational with the LWG providing data or recommended project approaches to EPA. In other meetings, EPA has the opportunity to provide the LWG with comments on technical approaches and documents.

Lastly, EPA, EPA's partners, and the LWG periodically hold informal *ad hoc* meetings and technical subgroup meetings during which technical experts have wide-ranging discussions of certain topics. The goal of these sessions is for both EPA and LWG technical experts to voice their opinions on technical issues. Principals from EPA and the LWG will attend *ad hoc* and technical subgroup meetings, although final resolution of technical issues is generally not a goal of these meetings.

9.3.3 Key Decisions

There are a number of key decisions that need to be made during the RI/FS, as well as any number of smaller decisions, that will focus the overall project.

Data Quality Objectives

EPA's (2000a) DQO process will be relied upon throughout the RI/FS to formulate the technical questions that will be addressed through field and/or literature studies.

EPA's 7-step DQO process will be applied prior to and following each data-gathering effort, including the compilation of historical data and field sampling programs, to identify outstanding data gaps and to make recommendations on any additional data-gathering activities that may be needed.

Risk Assessment Parameters

Numerous decisions must be made prior to submittal of the HHRA, ERA, and baseline risk assessment deliverables. For the ERA, decisions regarding assessment endpoints, receptors, exposure, models, and toxicological data and other issues will be made. For the HHRA, key issues include exposure scenarios, consumption rates, and toxicological data. These decisions are being made through a combination of informal *ad hoc*, subgroup, and formal technical meetings.

Preliminary Remedial Action Objectives

The development of preliminary RAOs is discussed in this Work Plan and Appendix A, Attachment A1. The preliminary RAOs are relatively broad statements of work that will be developed as additional information is gathered during the RI/FS. It is anticipated that the preliminary RAOs will be developed at the start of the FS and final RAOs will be developed by the end of the FS process. The final RAOs will continue to be broadly defined statements of goals for the overall selected remedial alternative or combination of alternatives.

Field Sampling Plans

Decisions on field sampling plans will be made following application of the DQO process and identification of risk assessment parameters. The LWG will develop its proposed approach, including the types, numbers, and locations of samples, types of analyses, analytical requirements, and data reporting, for consideration by EPA. The LWG will revise these plans following receipt of comments from EPA.

Treatability Testing

As a step in the FS, a decision will need to be made regarding the need for treatability testing to develop further information regarding candidate treatment technologies, if any are identified. Treatability testing is complex and can involve a significant amount of time. The determination that treatability testing will be necessary should be made early in the overall RI/FS to allow time for such testing.

Identification of Potential Sediment Management Areas

A key decision will be the determination of potential sediment management areas (SMAs). Based on results of the baseline risk assessment, areas associated with unacceptable ecological or human health risk will be identified. These areas will be compared to other physical and site use areas to define SMAs. The FS will evaluate remedial alternatives for each SMA. EPA will decide on the cleanup action(s) that will be required for each SMA in its ROD.

Identification of Source Impacts to Site

Elements of sampling and analysis plans and data evaluations will be designed to understand how sources impact river sediments and waters. These include issues of upland sources, including groundwater, and sources entering the Site from upstream and downstream. Where this information indicates that sources are causing unacceptable risks to the Site, they will be referred to the appropriate agency for further investigation and, where appropriate, source controls. It is the LWG's understanding that DEQ is primarily responsible for investigating sources related to upland sites along the river, while EPA will be primarily responsible for investigating sources that are originating from upstream (or downstream) in the watershed. Further, the LWG understands that the RI/FS must include sampling and evaluations to understand source risks within the Site, but that the appropriate agencies are primarily responsible for identifying PRPs for those sources and enforcing appropriate actions by those parties.

9.4 REPORTING REQUIREMENTS

Required reporting includes monthly progress reports due to EPA on the 10th of each month, and the RI/FS technical reports provided in Table 9-2. Draft documents are to be provided to EPA according to the schedule presented in the AOC. Following receipt of draft documents, EPA will prepare written comments and provide them to the LWG. EPA has indicated that written comments will be provided no more than 30 days following receipt of a document.

Data, GIS products, maps, and/or photos will also be delivered to EPA, per the approved schedule and following the AOC requirements.

All draft and final technical documents will be posted to the project web site for agency review and comment, according to the deliverable dates outlined in the next section. Document content will follow EPA guidance for major deliverables such as the RI, baseline risk assessment, and FS.

As required by the AOC, deliverables will be sent by certified mail, return receipt requested, to the individuals listed in Table 9-1, the LWG co-chairs, and to any other addressees that EPA may designate in writing.

Monthly progress reports will describe activities conducted during the prior month; the preliminary results of any sampling, testing, or other data analysis performed during that period; the schedule for the next two months; and any problems or issues encountered, along with proposed resolutions.

9.5 SCHEDULE

The schedule for the RI/FS deliverables and tasks is provided in Table 9-2. Schedule control will be a very important task throughout the RI/FS. The goal of the EPA and the LWG continues to be conducting the RI/FS in an expedited manner. As such, the LWG frequently reviews work progress and associated schedules with the LWG consultants to ensure that the project is being completed as efficiently as possible. Schedule deviations may be requested to increase the overall efficiency of the program. For example, the schedule for this Work Plan was extended to allow for additional time for meetings with EPA and its project team to ensure that the work elements in the Work Plan met with EPA approval, thus reducing both EPA review time and the time needed for the LWG to revise and finalize the document.

There may be other instances when EPA and the LWG agree that a schedule revision is needed to resolve issues. If this occurs, the LWG will work with EPA to resolve the issues in a reasonable timeframe.

9.6 COST CONTROL

EPA and the LWG acknowledge that the RI/FS will be a complex and costly effort. However, EPA and the LWG also believe that the project can be completed cost-effectively. Elements of cost control include adhering to EPA's DQO process (EPA 2000a) to ensure that field studies focus on the collection of data that are necessary for the decision-making process, generating data that allow EPA and the LWG to focus on the most critical issues (e.g., sediment profile imaging to better understand physical transport), and the use of electronic deliverables whenever possible. These and other approaches will be used to control costs to the extent practical.

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11.0 GLOSSARY OF TERMS

A

Absorption: The uptake of water, other fluids, or dissolved chemicals by a cell or an organism (as tree roots absorb dissolved nutrients in soil).

Acceptable Levels: Levels of chemicals in media that do not cause unacceptable adverse risk to either ecological or human health receptors.

Adsorption: The process of adhering a chemical on the surface of a solid material as a chemical transport mechanism.

Alluvial: Relating to sediment deposited by flowing water.

Anthropogenic: Natural and human-made substances present in the environment as a result of human activities.

Aqueous: Composed of liquid water medium.

Aquifer: An underground geological formation, or group of formations, containing usable and practicably extractable quantities of water. Aquifers are sources of groundwater for wells and springs.

Assessment Endpoint: In ecological risk assessments, an explicit expression of the environmental value to be protected. It includes both an ecological entity and specific attribute thereof. For example, osprey are a valued ecological entity; reproduction and population maintenance of osprey, the attribute, form an assessment endpoint.

Attenuation: The process by which a compound is reduced in concentration over time, through absorption, adsorption, degradation, dilution, or transformation.

B

Background: Constituents or locations that are not influenced by the releases from a site, either naturally occurring or anthropogenic.

Bed Load: Sediment particles resting on or near the channel bottom that are pushed or rolled along by the flow of water.

Benthic Invertebrates: Organisms without vertebrae dwelling either in the sediment or on the sediment in streams and rivers.

Bioavailability: Degree of ability to be absorbed and ready to interact in organism metabolism.

Biota: The animal and plant life of a given region.

C

Carcinogen: Any substance that can cause or aggravate cancer.

Characterization of Ecological Effects: A step in the ecological risk assessment process that evaluates the ability of a stressor to cause adverse effects under given circumstances.

Characterization of Exposure: A step in the ecological risk assessment process that evaluates the interaction of a stressor with one or more receptors.

Cleanup: Actions taken to deal with a release or threat of release of a hazardous substance that could affect humans or the environment. The term "cleanup" is sometimes used interchangeably with the terms remedial action, removal action, response action, natural attenuation, or corrective action.

Columbia River Datum (CRD): A vertical datum established for the Columbia River from the lower river to the Bonneville Dam and on the Willamette from the Columbia up to Willamette Falls. At the Morrison Street bridge gauge, the CRD is 1.85 feet above NVGD29/47.

Combined Sewer Overflow: Discharge of a mixture of stormwater and domestic waste when the flow capacity of a sewer system is exceeded during rainstorms.

Community: In ecology, an assemblage of populations of different species within a specified location in space and time. Sometimes, a particular subgrouping may be specified, such as the benthic community in a river.

Confined Aquifer: An aquifer in which groundwater is confined under pressure that is significantly greater than atmospheric pressure.

Chemical(s) of Concern (COC): Chemicals identified through the baseline risk assessment that are judged to cause unacceptable adverse effects to human health and/or ecological receptors.

Chemical(s) of Interest (COI): Chemicals that have been detected at a site but have not been screened in the risk assessment process.

Chemical(s) of Potential Concern (COPC): Chemicals of interest that have been screened-in for evaluation in the risk assessment process.

D

Data Quality Objectives (DQOs): Qualitative and quantitative statements of the overall level of uncertainty that a decision-maker will accept in results or decisions based on environmental data. They provide the framework for planning and managing environmental data operations consistent with user's needs.

Dermal Absorption: Process by which a chemical penetrates the skin and enters the body as an internal dose.

Dermal Contact: Contact between a chemical and the skin.

Detection Limit: The lowest concentration of a chemical that can reliably be distinguished, with a stated level of confidence, from a zero concentration.

Dredging: Removal of mud and sediment from the bottom of water bodies.

E

Early Action: A non-time critical removal action pursuant to 40 CFR 300.415(b)(4).

Ecological Exposure: Exposure of a non-human organism to a stressor.

Ecological Risk Assessment: The application of a formal framework, analytical process, or model to estimate the effects of human actions(s) on a natural resource and to interpret the significance of those effects in light of the uncertainties identified in each component of the assessment process. Such analysis includes initial problem formulation, exposure and effects assessments, and risk characterization.

Ecosystem: The interacting system of a biological community and its non-living environmental surroundings.

Effluent: Wastewater--treated or untreated--that flows out of a treatment plant or industrial outfall. Generally refers to wastes discharged into surface waters.

Environmental Exposure: The interaction of a stressor with a human or ecological receptor.

Erosion: The removal of soil or sediment by wind or water.

Exposure Assessment: Identifying the pathways by which chemicals may reach receptors and estimating how much of a chemical an individual is likely to be exposed to.

Exposure Concentration: The concentration of a chemical interacting with the receptor.

Exposure Pathway: The path from sources of chemicals through environmental media to human or ecological receptors.

Exposure Route: The way a chemical enters an organism after contact (e.g., ingestion).

Exposure: The interaction of a stressor with a human or ecological receptor.

F

Flood Stage: A river stage established by the National Weather Service (NWS) above which flood damage may occur. The NWS defines flood stage for the Willamette River at Portland as 18.0 feet (datum unspecified).

G

Groundwater: Fresh water found beneath the earth's surface, usually in aquifers, that supplies wells and springs.

Groundwater Discharge: Groundwater entering surface water or exiting to the ground surface.

H

Habitat: The place where a population or community (e.g., human, animal, plant, microorganism) lives and its surroundings, both living and non-living.

Hazardous Substance: Any substance defined as a "hazardous substance" under CERCLA or ORS Chapter 465.

Hydraulic Gradient: In general, the direction of groundwater flow due to changes in the depth of the water table.

Hydrogeology: The geology of groundwater, with particular emphasis on the chemistry and movement of water.

I

Initial Study Area (ISA): The 5.7-mile stretch of the Willamette River from approximately the southern tip of Sauvie Island at river mile 3.5 to the southern end of Swan Island at river mile 9.2, and adjacent areas logically associated with an evaluation of the in-water portion of this stretch of the river. The ISA does not include upland sources of contamination being investigated or cleaned up pursuant to ORS 465 as implemented by the Oregon Department of Environmental Quality.

L

Light Non-Aqueous Phase Liquid (LNAPL): A non-aqueous phase liquid with a specific gravity less than 1.0. Because the specific gravity of water is 1.0, most LNAPLs float on top of the water table. Most common petroleum hydrocarbon fuels and lubricating oils are LNAPLs.

Lipid Solubility: The maximum concentration of a chemical that will dissolve in fatty substances. Lipid soluble substances are insoluble in water. They will very selectively disperse through the environment via uptake in living tissue.

Lowest Observed Adverse Effect Level (LOAEL): The lowest level of a stressor that causes statistically and biologically significant differences in test samples as compared to other samples subjected to no stressor.

M

Matrix: The sample material in which the chemicals of interest are found (e.g., water, sediment, tissue).

Mean High River Stage: The arithmetic mean of the maximum (e.g., highest daily measurement) observed river stage data in a given period (e.g., monthly mean high river stage).

Mean Sea Level (MSL): MSL is a tidal datum determined over a 19-year National Tidal Datum Epoch. It pertains to local mean sea level and should not be confused with the fixed datums of North American Vertical Datum of 1988 (NAVD88) or the National Geodetic Vertical Datum of 1929 (NGVD29). Data referencing MSL as the vertical datum in the Portland Harbor is technically on NGVD29/47.

Media: Specific environments such as air, water, soil that are the subject of regulatory concern and activities.

Mean High Water (MHW): A tidal datum. The average of all the high water heights observed over the National Tidal Datum Epoch (19-year period).

Mean Low Water (MLW): A tidal datum. The average of all the low water heights observed over the National Tidal Datum Epoch (19-year period).

Method Detection Limit (MDL): See *Detection Limit*.

Municipal Discharge: Discharge of effluent from wastewater treatment plants that receive wastewater from households, commercial establishments, and industries in the coastal drainage basin. Combined sewer/separate storm overflows are included in this category.

N

North American Vertical Datum of 1988 (NAVD88): This vertical datum is the national standard geodetic reference for heights. NAVD88 is a fixed datum derived from local mean sea level observations at Father Point/Rimouski, Quebec, Canada. NAVD88 replaced NGVD29/47 as the national standard geodetic reference for heights.

National Geodetic Vertical Datum of 1929 and Supplemental Adjustment of 1947 (NGVD29/47): NGVD29/47 is a fixed datum adopted and adjusted in 1947 as a national standard geodetic reference for heights prior to June 24, 1993 and is now considered superseded by NAVD88. NGVD29 is sometimes referred to as Sea Level Datum of 1929 or as **Mean Sea Level (MSL)** on some early issues of U.S. Geological Survey topographic quads. NGVD 29 was originally derived from a general adjustment of the first-order leveling networks of the U.S. and Canada after holding mean sea level observed at 26 long-term tide stations as fixed. Historical data referencing MSL as the vertical datum in Portland Harbor is technically on NGVD29/47.

Naturally Occurring: Substances present in the environment in forms that have not been influenced by human activity.

Nature and Extent: Characterization of chemical distribution within a site.

No Observable Adverse Effect Level (NOAEL): An exposure level at which there are no statistically or biologically significant increases in the frequency or severity of adverse effects between the exposed population and its appropriate control. Some effects may be produced at this level, but they are not considered adverse or precursors to adverse effects.

No Observed Effect Concentration (NOEC): Exposure concentrations at which there are no statistically or biological significant differences in the frequency or severity of any effect in the exposed or control populations.

Non-Point Sources: Diffuse pollution sources (i.e. without a single point of origin or not introduced into a receiving stream from a specific outlet). The pollutants are generally carried off the land by stormwater.

O

Operable Unit: A discrete action that comprises an incremental step toward comprehensively addressing site problems. This discrete portion of a remedial response manages migration or eliminates or mitigates a release, threat of release, or pathway of exposure.

Ordinary High Water or High Water: Defined as the vegetation line or the line the water impresses on the soil by covering it for sufficient periods to deprive it of vegetation. It is established by field observation of seasonally high river levels by the U.S. Army Corps of Engineers and designates the jurisdictional limits of the Corps regulatory program. From Willamette RM 0 to 16, the ordinary high-water level ranges from 14.7 to 15.2 feet CRD (USACE 1991). The Oregon Division of State Lands defines the ordinary high water line (OHWL) as a line on the bank or shore to which high water ordinarily rises annually in season. The OHWL excludes exceptionally high-water levels caused by large floods (e.g., 100-year events).

P

Pathway: The physical course a chemical or pollutant takes from its source to the exposed organism.

Perched Water: Zone of unpressurized water held above the water table by impermeable rock or sediment.

Permeability: The rate at which liquids pass through soil or other materials in a specified direction.

Plume: A visible or measurable discharge of a contaminant from a given point of origin.

Point Source: A stationary location or fixed facility from which pollutants are discharged.

Population: A group of interbreeding organisms (i.e. members of the species) occupying a particular space; the number of humans or other living creatures in a designated area.

Porewater: Water extracted from the interstices of a sediment sample for water quality analysis or toxicity testing purposes.

Portland River Datum (PRD): Datum of reference plane from which river stage is measured on the Willamette River at Portland at the Morrison Bridge gauge. PRD equals 1.55 feet above NGVD29/47 or MSL, and the PRD gauge reports water levels 0.30 foot above CRD levels at this location.

Pre-AOC: Events including sampling and other studies that occurred prior to signing of the AOC for the Site.

Principal Threat: Those source materials considered highly toxic or highly mobile that generally cannot be reliably contained or would present a significant risk to human health or the environment should exposure occur.

Q

Quality Assurance/Quality Control (QA/QC): A system of procedures, checks, audits, and corrective actions to ensure that all EPA research design and performance, environmental monitoring and sampling, and other technical and reporting activities are of the highest achievable quality.

R

Receptor: Human or ecological entity to be evaluated in a risk assessment.

Recharge Area: A land area in which water reaches the zone of saturation from surface infiltration (e.g., where rainwater soaks through the earth to reach an aquifer).

Recharge: The process by which groundwater is added to a zone of saturation, usually by percolation from the soil surface (e.g., the recharge of an aquifer).

Remedial Action (RA): The actual construction or implementation phase of a Superfund site cleanup that follows remedial design.

Risk: A measure of the probability that an adverse effect to human health or ecological receptors will occur as a result of a release of a hazardous substance.

Risk Assessment: Qualitative and quantitative evaluation of the risk posed to human health or the environment by the actual or threatened release of specific chemical(s).

Risk Characterization: The last phase of the risk assessment process that estimates the potential for adverse human or ecological effects to occur from exposure to a stressor and evaluates the uncertainty associated with the estimate.

Risk Estimate: A description of the probability that organisms exposed to a specific dose of a chemical will develop an adverse effect (e.g., cancer).

Risk Management: The process of evaluating and selecting alternative regulatory and non-regulatory responses to risk. The selection process necessarily requires the consideration of legal, economic, and behavioral factors.

Risk Reduction: Lessening the unacceptable risks from chemicals by lowering their concentrations, mobility, bioavailability, toxicity, or exposure to receptors.

River Stage: Height of a river measured relative to a datum or specific elevation.

Round 1: RI/FS field work performed during 2002. Initially termed Round 1A and Round 1 to denote separation of several months between sampling events.

Round 2: RI/FS field work proposed for after Round 1.

Round 3: RI/FS field work proposed for after the preliminary risk assessment is completed.

S

Saturated Zone: The area below the water table where all open spaces are filled with water under pressure equal to or greater than that of the atmosphere.

Silt: Sedimentary materials composed of fine or intermediate-sized mineral particles.

Solubility: The amount of mass of a compound that will dissolve in a unit volume of solution. Aqueous solubility is the maximum concentration of a chemical that will dissolve in pure water at a reference temperature.

Sorption: The action of soaking up or attracting substances.

Storm Sewer: A system of pipes (separate from sanitary sewers) that carries water runoff from buildings and land surfaces.

Stressors: Physical, chemical, or biological entities that can induce adverse effects on ecosystems or human health.

Surface Runoff: Precipitation, snowmelt, or irrigation water in excess of what can infiltrate the soil surface and be stored in surface depressions.

Surface Water: All water naturally open to the atmosphere (e.g., rivers, lakes, reservoirs, ponds, streams, impoundments, seas, estuaries).

T

Threshold: The lowest dose or concentration of a chemical at which a specified measurable effect is observed and below which it is not observed.

Transition Zone: The interval where both groundwater and surface water comprise some percentage of the water occupying pore space in sediments.

Trophic Levels: A functional classification of species that is based on feeding relationships.

Toxicity Testing: Biological testing (usually with an invertebrate, fish, or small mammal) to determine the adverse effects of a compound or effluent.

Toxicity: The concentration at which a substance or mixture of substances can cause adverse effects in humans or animals.

U

Unconfined Aquifer: An aquifer containing water that is not under pressure; and where the water level in a well is the same as the water table outside the well.

Unsaturated Zone: The area above the water table where soil pores are not fully saturated, although some water may be present.

Urban Runoff: Stormwater from urban environments including industrial, residential, commercial, vacant, and transportation land uses.

V

Vadose Zone: The zone between land surface and the water table within which the moisture content is less than saturation (except in the capillary fringe) and pressure is less than atmospheric. Soil pore space also typically contains air or other gases. The capillary fringe is included in the vadose zone.

Volatile: Any substance that evaporates readily.

W

Water Quality Criteria: Standards of water quality not to be exceeded under the Clean Water Act.

Weight of Scientific Evidence: Considerations in assessing the interpretation of published information about toxicity—such as quality of testing methods, size, and power of study design; consistency of results across studies; and biological plausibility of exposure-response relationships and statistical associations.

Willamette River Flood Stage: Defined as +18 feet CRD on the lower Willamette River.

Leon Lahiere

From: ORR Jim [orr.jim@deq.state.or.us]
Sent: Tuesday, June 10, 2008 4:17 PM
To: Leon Lahiere
Cc: ORR Jim
Subject: RE: Brix Maritime Portland: Catch Basin Sediment Results
Attachments: ORR Jim.vcf

Leon, Please include your sampling plan in your technical memorandum documenting the stormwater catch basin sampling.

I would request that PCB compound screening be performed for the two stormwater first flush samples and then evaluate the results against JSCS SLVs.

The detections that you reported for sediment PCBs was still above the Bioaccumulation SLV of 0.39 ppb.

Please request as the lowest detection limits for PCBs to best compare with SLV.f

Thanks Jim Orr

-----Original Message-----

From: Leon Lahiere [mailto:leon.lahiere@hartcrowser.com]
Sent: Thursday, March 20, 2008 2:31 PM
To: ORR Jim
Subject: Brix Maritime Portland: Catch Basin Sediment Results

Jim,

Per your request, attached are the analytical results for the catch basin sediment samples and a figure showing the location/designation of each catch basin. A technical memorandum is being prepared that will describe the sampling activities, observations, and data results in detail. Several PAHs and phthalates were present at concentrations exceeding JSCS SLVs. Several non-chlorinated VOCs were present at low concentrations, and no VOCs with JSCS SLVs were detected in the samples. Aroclor 1260 was the only PCB compound detected in the sediment samples, but at concentrations that are one order of magnitude below the SLV.

Based on the results and in accordance with the approved work plan, we propose analyzing stormwater discharge samples for TPH-Gx/Dx, PAHs, Phthalates, and TSS. In addition, subsequent to the sampling activities, Brix removed the accumulated sediment from the catch basins and installed new filters.

Thank you. Please contact me at your convenience with your comments or if you have any questions or concerns.

Leon Lahiere, R.G.
Senior Associate
Hart Crowser, Inc.
Five Centerpointe Drive, Suite 240
Lake Oswego, OR 97035
Direct Line: (971) 327-9103
Office/Reception: (503) 620-7284
FAX: (503) 620-6918

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BRIX MARITIME CO.

UNANIMOUS CONSENT IN LIEU OF THE 2007 ANNUAL MEETING OF SHAREHOLDERS AND THE BOARD OF DIRECTORS

The undersigned, being the sole shareholder and the sole director of Brix Maritime Co., a Delaware corporation (the "Corporation"), hereby waive all notices, statutory and otherwise, and unanimously consent to the following corporate action in lieu of holding a meeting for that purpose, pursuant to the Corporation's Bylaws and Title 8, Sections 228 and 141(f) of the General Corporation Law of the State of Delaware:

1. Election of Directors

RESOLVED, that the shareholder hereby elects the following person to serve on the Board of Directors of the Corporation until the next annual meeting of the shareholder or until his successor is elected and qualified:

Paul E. Stevens

2. Election of Officers

RESOLVED, that the Board of Directors elects the following persons to serve as officers of the Corporation until the next annual meeting of the Board or until their successors are elected and qualified:

President.....	Gary C. Faber
Secretary.....	Frank H. Williamson
Treasurer.....	Kevin L. Orstad
Assistant Secretary.....	Steven E. Giese

3. Distributions

WHEREAS, the Board has determined, pursuant to Section 170, Delaware General Corporation Law, based on financial statements of the Corporation presented to the Board, that after giving effect to the below-described distributions, the Corporation will be able to pay its liabilities as they become due in the usual course of business and the Corporation's total assets will exceed its total liabilities;

NOW, THEREFORE, IT IS HEREBY

RESOLVED, that the Board approves and ratifies distributions made to the parent corporation, in an amount determined by the Treasurer, prior to the end of calendar year 2007;

provided that, after giving effect to the distributions made hereunder, the Corporation will remain able to pay its liabilities as they become due in the usual course of business and the Corporation's total assets will remain in excess of the sum of its total liabilities plus any shareholder's preferential rights in liquidation.

4. Ratification of Acts

RESOLVED, that all actions taken by the corporate officers and the Board of Directors on behalf of the Corporation since the last annual meeting are hereby ratified and approved.

5. Counterparts

RESOLVED, that this Consent by the undersigned may be executed in counterparts (including by facsimile), shall be effective upon the date of the last signature hereon below, and when effective, may be treated by all persons as having the same effect as if the resolutions herein contained were lawfully adopted at a meeting actually held upon due and proper notice.

[Remainder of Page Intentionally Left Blank]

SHAREHOLDER:

FOSS MARITIME COMPANY

By


Paul E. Stevens, Chief Executive Officer

Dated

12.14.07

DIRECTOR:


Paul E. Stevens

Dated

12.14.07

NATIONAL RESPONSE CENTER 1-800-424-8802

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Incident Report # 88028

INCIDENT DESCRIPTION

*Report taken at 11:54 on 12-SEP-91

Incident Type: VESSEL

Incident Cause: OTHER

Affected Area:

The incident occurred on 12-SEP-91 at 08:30 local time.

Affected Medium: WATER WILLAMETTE RIVER

SUSPECTED RESPONSIBLE PARTY

Organization: BRIX MARITIME
PORTLAND, OR 97283

Type of Organization: PRIVATE ENTERPRISE

INCIDENT LOCATION

9030 N.W. ST HELENS RD County: MULTNOMAH

City: PORTLAND State: OR

RELEASED MATERIAL(S)

CHRIS Code: WTO Official Material Name: WASTE OIL/LUBRICANTS - POSS. CON

Also Known As:

Qty Released: 3 GALLON(S) Qty in Water: 3 GALLON(S)

DESCRIPTION OF INCIDENT

TUGBOAT / SUMP SYSTEM OVERFLOWED.

INCIDENT DETAILS

Platform Rig Name:

Platform Letter:

Location Area ID:

Location Block ID:

OCSG Number:

OOSP Number:

State Lease Number:

Pier Dock Number:

Berth Slip Number:

---VESSEL INFORMATION---

Name: UNKNOWN NAME1 Number: BETSY L Aground: NO

Flag:

Length: Breadth: Draught:

Type: UNKNOWN

Hull Construction:

Fuel Capacity:

Fuel on Board:

Cargo Capacity:

Cargo on Board:

DAMAGES

FATALITIES: UNKN Empl/Crew: Passenger: Occupant:
EVACUATIONS: NO Who Evacuated: Radius/Area:
Damages: NO

Closure Type	Description of Closure	Length of Closure	Direction of Closure
Air: N			
Road: N			Major Artery: N
Waterway: N			
Track: N			

Passengers Transferred: UNKNOWN
Environmental Impact: UNKNOWN
Media Interest: Community Impact due to Material: NO

REMEDIAL ACTIONS

DEPLOYED A SORBENT BOOM TO PICK UP THE SHEEN.

Release Secured: UNKNOWN

Release Rate:

Estimated Release Duration:

WEATHER

ADDITIONAL AGENCIES NOTIFIED

Federal:
State/Local:
State/Local On Scene:
State Agency Number:

NOTIFICATIONS BY NRC

MSO PORTLAND, OR (PRIMARY)
12-SEP-91 11:58

ADDITIONAL INFORMATION

SHEEN SIZE - 50 FT BY 100 FT, SILVER.WILL NOTIFY DEQ.

*** END INCIDENT REPORT # 88028 ***

NATIONAL RESPONSE CENTER 1-800-424-8802

*** For Public Use ***

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Incident Report # 117331

INCIDENT DESCRIPTION

*Report taken at 20:58 on 10-MAY-92

Incident Type: VESSEL

Incident Cause: UNKNOWN

Affected Area:

The incident occurred on 10-MAY-92 at 20:50 local time.

Affected Medium: WATER WILLAMETTE RIVER

SUSPECTED RESPONSIBLE PARTY

Organization: BRIX MARITIME
PORTLAND, OR 97223

Type of Organization: PRIVATE ENTERPRISE

INCIDENT LOCATION

9030 ST HELENS County: MULTNOMAH

City: PORTLAND State: OR Zip: 97223

RELEASED MATERIAL(S)

CHRIS Code: ODS Official Material Name: OIL: DIESEL

Also Known As:

Qty Released: 50 GALLON(S) Qty in Water: 50 GALLON(S)

DESCRIPTION OF INCIDENT

BLOW HOLE/UNKNOWN

INCIDENT DETAILS

Platform Rig Name:

Platform Letter:

Location Area ID:

Location Block ID:

OCSG Number:

OCSP Number:

State Lease Number:

Pier Dock Number:

Berth Slip Number:

---VESSEL INFORMATION---

Name: UNKNOWN NAME1 Number: TUG LEWISTON Aground: NO

Flag:

Length: Breadth: Draught:

Type: UNKNOWN

Hull Construction:

Fuel Capacity:

Fuel on Board:

Cargo Capacity:

Cargo on Board:

DAMAGES

FATALITIES: UNKN Empl/Crew: Passenger: Occupant:
EVACUATIONS: NO Who Evacuated: Radius/Area:
Damages: NO

<u>Closure Type</u>	<u>Description of Closure</u>	<u>Length of Closure</u>	<u>Direction of Closure</u>
Air:	N		
Road:	N		Major Artery: N
Waterway:	N		
Track:	N		

Passengers Transferred: UNKNOWN
Environmental Impact: UNKNOWN
Media Interest: Community Impact due to Material: NO

REMEDIAL ACTIONS

BOOMED MATERIAL, USING SORBENT PADS
Release Secured: UNKNOWN
Release Rate:
Estimated Release Duration:

WEATHER

ADDITIONAL AGENCIES NOTIFIED

Federal:
State/Local:
State/Local On Scene:
State Agency Number:

NOTIFICATIONS BY NRC

MSO PORTLAND, OR (PRIMARY)
10-MAY-92 21:03

ADDITIONAL INFORMATION

SHEEN: 50X63 FT, RAINBOW

*** END INCIDENT REPORT # 117331 ***

NATIONAL RESPONSE CENTER 1-800-424-8802

*** For Public Use ***

Information released to a third party shall comply with any applicable federal and/or state Freedom of Information and Privacy Laws

Incident Report # 128283

INCIDENT DESCRIPTION

*Report taken at 14:49 on 22-JUL-92

Incident Type: VESSEL

Incident Cause: OPERATOR ERROR

Affected Area:

The incident occurred on 22-JUL-92 at 11:45 local time.

Affected Medium: WATER WILLAMETTE RIVER

SUSPECTED RESPONSIBLE PARTY

Organization: BRIX MARITIME
PORTLAND, OR 97223

Type of Organization: PRIVATE ENTERPRISE

INCIDENT LOCATION

9030 ST HELENS County: MULTNOMAH

WILLAMETTE RIVER

City: PORTLAND State: OR Zip: 97223

RELEASED MATERIAL(S)

CHRIS Code: ODS Official Material Name: OIL: DIESEL ✓

Also Known As:

Qty Released: .99 GALLON(S) ✓ Qty in Water: .99 GALLON(S)

DESCRIPTION OF INCIDENT

TUG CHIEF / MATERIAL SPILLED WHEN VALVE WAS BEING REPLACED

INCIDENT DETAILS

Platform Rig Name:

Platform Letter:

Location Area ID:

Location Block ID:

OCSG Number:

OCSF Number:

State Lease Number:

Pier Dock Number:

Berth Slip Number:

---VESSEL INFORMATION---

Name: UNKNOWN NAME1 Number: TUG CHIEF Aground: NO

Flag:

Length: Breadth: Draught:

Type: UNKNOWN

Hull Construction:

Fuel Capacity:

Fuel on Board:

Cargo Capacity:

Cargo on Board:

INJURIES: UNKN Hospitalized: Empl/Crew: Passenger:
FATALITIES: UNKN Empl/Crew: Passenger: Occupant:
EVACUATIONS: NO Who Evacuated: Radius/Area:
Damages: NO

<u>Closure Type</u>	<u>Description of Closure</u>	<u>Length of Closure</u>	<u>Direction of Closure</u>
Air:			
Road:			Major Artery:
Waterway:			
Track:			

Passengers Transferred: UNKNOWN
Environmental Impact: UNKNOWN
Media Interest: Community Impact due to Material:

REMEDIAL ACTIONS

NONE
Release Secured:
Release Rate:
Estimated Release Duration:

WEATHER

ADDITIONAL AGENCIES NOTIFIED

Federal:
State/Local:
State/Local On Scene:
State Agency Number:

NOTIFICATIONS BY NRC

MSO PORTLAND, OR (PRIMARY)
22-JUL-92 14:51

ADDITIONAL INFORMATION

*** END INCIDENT REPORT # 128283 ***

NATIONAL RESPONSE CENTER 1-800-424-8802

*** For Public Use ***

Information released to a third party shall comply with any applicable federal and/or state Freedom of Information and Privacy Laws

Incident Report # 142757

INCIDENT DESCRIPTION

*Report taken at 17:00 on 30-OCT-92

Incident Type: VESSEL

Incident Cause: EQUIPMENT FAILURE

Affected Area:

The incident occurred on 30-OCT-92 at 13:55 local time.

Affected Medium: WATER WILLAMETTE RIVER>COLUMBIA RIVER

SUSPECTED RESPONSIBLE PARTY

Organization: BRIX MARITIME
PORTLAND, OR 97223

Type of Organization: PRIVATE ENTERPRISE

INCIDENT LOCATION

9030 ST HELENS County: MULTNOMAH

City: PORTLAND State: OR Zip: 97223

RELEASED MATERIAL(S)

CHRIS Code: OIL Official Material Name: OIL: CRUDE

Also Known As:

Qty Released: 0 UNKNOWN AMOUNT Qty in Water: 0 UNKNOWN AMOUNT

DESCRIPTION OF INCIDENT

TUG BOAT KNAPPTON/ACCIDENTAL DISCHARGE OF BILGE WATERSHEEN SIZE:75' X 10',BLUE

INCIDENT DETAILS

Platform Rig Name:
Platform Letter:
Location Area ID:
Location Block ID:
OCSG Number:
OCSP Number:
State Lease Number:
Pier Dock Number:
Berth Slip Number:

---VESSEL INFORMATION---

Name: UNKNOWN NAME1 Number: TUG KNAPPTON Aground: NO

Flag:

Length: Breadth: Draught:

Type: UNKNOWN

Hull Construction:

Fuel Capacity:

Fuel on Board:

Cargo Capacity:

Cargo on Board:

DAMAGES

INJURIES: UNKN Hospitalized: Empl/Crew: Passenger:
FATALITIES: UNKN Empl/Crew: Passenger: Occupant:
EVACUATIONS: NO Who Evacuated: Radius/Area:
Damages: NO

<u>Closure Type</u>	<u>Description of Closure</u>	<u>Length of Closure</u>	<u>Direction of Closure</u>	
Air:				
Road:				Major Artery:
Waterway:				
Track:				

Passengers Transferred: UNKNOWN
Environmental Impact: UNKNOWN
Media Interest: Community Impact due to Material:

REMEDIAL ACTIONS

BOOMS DEPLOYED
Release Secured:
Release Rate:
Estimated Release Duration:

WEATHER

ADDITIONAL AGENCIES NOTIFIED

Federal:
State/Local:
State/Local On Scene:
State Agency Number:

NOTIFICATIONS BY NRC

U.S. EPA X SEATTL (PRIMARY)
30-OCT-92 17:04

ADDITIONAL INFORMATION

*** END INCIDENT REPORT # 142757 ***

NATIONAL RESPONSE CENTER 1-800-424-8802

*** For Public Use ***

Information released to a third party shall comply with any applicable federal and/or state Freedom of Information and Privacy Laws

Incident Report # 158735

INCIDENT DESCRIPTION

*Report taken at 00:44 on 19-FEB-93

Incident Type: VESSEL

Incident Cause: NATURAL PHENOMENON

Affected Area:

The incident occurred on 18-FEB-93 at 21:30 local time.

Affected Medium: LAND WOOD / WILLAMETTE RIVER

SUSPECTED RESPONSIBLE PARTY

Organization: BRIX MARITIME
PORTLAND, OR 97267

Type of Organization: PRIVATE ENTERPRISE

INCIDENT LOCATION

GATX OIL TERMINAL County: MULTNOMAH

WILLAMETTE RIVER WEST

BANK

City: PORTLAND State: OR Zip: 97283

RELEASED MATERIAL(S)

CHRIS Code: OTH Official Material Name: OTHER OIL

Also Known As: OTHER OIL (BLACK OIL)

Qty Released: 5 GALLON(S) Qty in Water: 1.5 GALLON(S)

DESCRIPTION OF INCIDENT

DRIP BUCKET BENEATH HOSE FROM T/B CASCADE TO DOCK / BLOWN OVER BY WIND

INCIDENT DETAILS

Platform Rig Name:

Platform Letter:

Location Area ID:

Location Block ID:

OCSG Number:

OCSF Number:

State Lease Number:

Pier Dock Number:

Berth Slip Number:

---VESSEL INFORMATION---

Name: UNKNOWN NAME1 Number: T/B CASCADE Aground: NO

Flag:

Length: Breadth: Draught:

Type: UNKNOWN

Hull Construction:

Fuel Capacity:

Fuel on Board:

Cargo Capacity:

Cargo on Board:

Fire Involved: NO Fire Extinguished: UNKNOWN
INJURIES: UNKN Hospitalized: Empl/Crew: Passenger:
FATALITIES: UNKN Empl/Crew: Passenger: Occupant:
EVACUATIONS: NO Who Evacuated: Radius/Area:

Damages: NO

<u>Closure Type</u>	<u>Description of Closure</u>	<u>Length of Closure</u>	<u>Direction of Closure</u>
Air:	N		
Road:	N		Major Artery: N
Waterway:	N		
Track:	N		

Passengers Transferred: UNKNOWN
Environmental Impact: UNKNOWN
Media Interest: Community Impact due to Material: NO

REMEDIAL ACTIONS

SORBENTS DEPLOYED
Release Secured: UNKNOWN
Release Rate:
Estimated Release Duration:

WEATHER

ADDITIONAL AGENCIES NOTIFIED

Federal:
State/Local:
State/Local On Scene:
State Agency Number:

NOTIFICATIONS BY NRC

MSO PORTLAND, OR (PRIMARY)
19-FEB-93 00:54

ADDITIONAL INFORMATION

CALLER WILL NOTIFY OR RESPONSE MECHANISMSSHEEN SIZE: UNKNOWN

*** END INCIDENT REPORT # 158735 ***

NATIONAL RESPONSE CENTER 1-800-424-8802

*** For Public Use ***

Information released to a third party shall comply with any applicable federal and/or state Freedom of Information and Privacy Laws

Incident Report # 168812

INCIDENT DESCRIPTION

*Report taken at 14:37 on 21-APR-93

Incident Type: FIXED

Incident Cause: OPERATOR ERROR

Affected Area:

The incident occurred on 21-APR-93 at 11:35 local time.

Affected Medium: WATER WILLAMETTE RIVER

SUSPECTED RESPONSIBLE PARTY

Organization: BRIX MARITIME
PORTLAND, OR 97267

Type of Organization: PRIVATE ENTERPRISE

INCIDENT LOCATION

9030 NW ST HELENS County: MULTNOMAH

City: PORTLAND State: OR Zip: 97267

RELEASED MATERIAL(S)

CHRIS Code: ODS Official Material Name: OIL: DIESEL

Also Known As:

Qty Released: .99 GALLON(S) Qty in Water: .99 GALLON(S)

DESCRIPTION OF INCIDENT

CHANGING OUT FUEL LINE ON DOCK AND A SMALL AMOUNT OF PRODUCT WASSPILLED INTO THE WATER

INCIDENT DETAILS

Package: N/A

Building ID:

Type of Fixed Object: UNKNOWN

Power Generating Facility: UNKNOWN

Generating Capacity:

Type of Fuel:

NPDES:

NPDES Compliance: UNKNOWN

DAMAGES

Fire Involved: NO Fire Extinguished: UNKNOWN

INJURIES: UNKN Hospitalized: Empl/Crew: Passenger:

FATALITIES: UNKN Empl/Crew: Passenger: Occupant:

EVACUATIONS: NO Who Evacuated: Radius/Area:

Damages: NO

<u>Closure Type</u>	<u>Description of Closure</u>	<u>Length of Closure</u>	<u>Direction of Closure</u>
Air:	N		

Artery:

Waterway: N

Track: N

Passengers Transferred: UNKNOWN

Environmental Impact: UNKNOWN

Media Interest: Community Impact due to Material: NO

REMEDIAL ACTIONS

BOOMS DEPLOYED AND SORBENT PADS BEING USED

Release Secured: UNKNOWN

Release Rate:

Estimated Release Duration:

WEATHER

ADDITIONAL AGENCIES NOTIFIED

Federal:

State/Local:

State/Local On Scene:

State Agency Number:

NOTIFICATIONS BY NRC

MSO PORTLAND, OR (PRIMARY)

21-APR-93 14:40

ADDITIONAL INFORMATION

SHEEN SIZE 20' X 10', RAINBOWWILL NTFY MSO PORTLAND

*** END INCIDENT REPORT # 168812 ***

NATIONAL RESPONSE CENTER 1-800-424-8802

*** For Public Use ***

Information released to a third party shall comply with any applicable federal and/or state Freedom of Information and Privacy Laws

Incident Report # 199227

INCIDENT DESCRIPTION

*Report taken at 16:24 on 23-SEP-93

Incident Type: VESSEL

Incident Cause: EQUIPMENT FAILURE

Affected Area:

The incident occurred on 23-SEP-93 at 13:20 local time.

Affected Medium: WATER WILLAMETTE RIVER

SUSPECTED RESPONSIBLE PARTY

Organization: BRIX MARITIME
PORTLAND, OR 97267

Type of Organization: PRIVATE ENTERPRISE

INCIDENT LOCATION

9030 NW ST HELENS County: MULTNOMAH

City: PORTLAND State: OR Zip: 97267

RELEASED MATERIAL(S)

CHRIS Code: OWA Official Material Name: WASTE OIL

Also Known As:

Qty Released: 1 GALLON(S) Qty in Water: 1 GALLON(S)

DESCRIPTION OF INCIDENT

TUG BOAT T. J. BRIX / HOSE LEAKED WHILE OFFLOADING WASTE OILSHEEN SIZE:
UNKNOWN / BLUE-GRAY

INCIDENT DETAILS

Platform Rig Name:

Platform Letter:

Location Area ID:

Location Block ID:

OCSG Number:

OOSP Number:

State Lease Number:

Pier Dock Number:

Berth Slip Number:

---VESSEL INFORMATION---

Name: UNKNOWN NAME1 Number: UNKNOWN Aground: NO

Flag:

Length: Breadth: Draught:

Type: UNKNOWN

Hull Construction:

Fuel Capacity:

Fuel on Board:

Cargo Capacity:

Cargo on Board:

DAMAGES

INJURIES: UNKN Hospitalized: Empl/Crew: Passenger:
FATALITIES: UNKN Empl/Crew: Passenger: Occupant:
EVACUATIONS: NO Who Evacuated: Radius/Area:
Damages: NO

<u>Closure Type</u>	<u>Description of Closure</u>	<u>Length of Closure</u>	<u>Direction of Closure</u>
Air:	N		
Road:	N		Major Artery: N
Waterway:	N		
Track:	N		

Passengers Transferred: UNKNOWN
Environmental Impact: UNKNOWN
Media Interest: Community Impact due to Material: NO

REMEDIAL ACTIONS

RECOVERED MATERIAL WITH PADS
Release Secured: UNKNOWN
Release Rate:
Estimated Release Duration:

WEATHER

ADDITIONAL AGENCIES NOTIFIED

Federal:
State/Local:
State/Local On Scene:
State Agency Number:

NOTIFICATIONS BY NRC

NATIONAL RESPONSE CENTER HQ (PRIMARY)
15-OCT-03 18:04
MSO PORTLAND, OR (PRIMARY)
23-SEP-93 16:29

ADDITIONAL INFORMATION

WILL NOTIFY LOCAL CG AND STATE AUTHORITIES

*** END INCIDENT REPORT # 199227 ***

NATIONAL RESPONSE CENTER 1-800-424-8802

*** For Public Use ***

Information released to a third party shall comply with any applicable federal and/or state Freedom of Information and Privacy Laws

Incident Report # 214674

INCIDENT DESCRIPTION

*Report taken at 15:34 on 30-DEC-93

Incident Type: VESSEL

Incident Cause: UNKNOWN

Affected Area:

The incident was discovered on 30-DEC-93 at 12:34 local time.

Affected Medium: WATER WILLAMETTE RIVER

SUSPECTED RESPONSIBLE PARTY

Organization: BRIX MARITIME
PORTLAND, OR 97267

Type of Organization: PRIVATE ENTERPRISE

INCIDENT LOCATION

9030 NW ST HELENS County: WASHINGTON

SHOP BARGE

City: PORTLAND State: OR Zip: 97267

RELEASED MATERIAL(S)

CHRIS Code: OUN Official Material Name: UNKNOWN OIL

Also Known As:

Qty Released: 0 UNKNOWN AMOUNT Qty in Water: 0 UNKNOWN AMOUNT

DESCRIPTION OF INCIDENT

TUG LEWISTON/UNKNOWN/SHEEN WAS DISCOVERED COMING FROM TUG

INCIDENT DETAILS

Platform Rig Name:

Platform Letter:

Location Area ID:

Location Block ID:

OCSG Number:

OOSP Number:

State Lease Number:

Pier Dock Number:

Berth Slip Number:

---VESSEL INFORMATION---

Name: UNKNOWN NAME1 Number: UNKNOWN Aground: NO

Flag:

Length: Breadth: Draught:

Type: UNKNOWN

Hull Construction:

Fuel Capacity:

Fuel on Board:

Cargo Capacity:

Cargo on Board:

INJURIES: UNKN Hospitalized: Empl/Crew: Passenger:
FATALITIES: UNKN Empl/Crew: Passenger: Occupant:
EVACUATIONS: NO Who Evacuated: Radius/Area:
Damages: NO

<u>Closure Type</u>	<u>Description of Closure</u>	<u>Length of Closure</u>	<u>Direction of Closure</u>
Air:	N		
Road:	N		Major Artery: N
Waterway:	N		
Track:	N		

Passengers Transferred: UNKNOWN
Environmental Impact: UNKNOWN
Media Interest: Community Impact due to Material: NO

REMEDIAL ACTIONS

INVESTIGATING FOR SOURCE
Release Secured: UNKNOWN
Release Rate:
Estimated Release Duration:

WEATHER

ADDITIONAL AGENCIES NOTIFIED

Federal:
State/Local:
State/Local On Scene:
State Agency Number:

NOTIFICATIONS BY NRC

MSO PORTLAND, OR (PRIMARY)
30-DEC-93 15:39

ADDITIONAL INFORMATION

SHEEN SIZE:50FT X 175FT SILVERY WITH SPOTS OF RAINBOWWILL NOTIFY:DEQ

*** END INCIDENT REPORT # 214674 ***

NATIONAL RESPONSE CENTER 1-800-424-8802

*** For Public Use ***

Information released to a third party shall comply with any applicable federal and/or state Freedom of Information and Privacy Laws

Incident Report # 217821

INCIDENT DESCRIPTION

*Report taken at 18:41 on 20-JAN-94

Incident Type: VESSEL

Incident Cause: EQUIPMENT FAILURE

Affected Area:

The incident occurred on 20-JAN-94 at 15:34 local time.

Affected Medium: WATER WILLAMETTE RIVER MILE 5.5

SUSPECTED RESPONSIBLE PARTY

Organization: BRIX MARITIME
PORTLAND, OR 97267

Type of Organization: PRIVATE ENTERPRISE

INCIDENT LOCATION

9030 NW ST HELENS County: MULTNOMAH

City: PORTLAND State: OR Zip: 97267

RELEASED MATERIAL(S)

CHRIS Code: OTD Official Material Name: OIL, FUEL: NO. 2-D

Also Known As:

Qty Released: 0 UNKNOWN AMOUNT Qty in Water: 0 UNKNOWN AMOUNT

DESCRIPTION OF INCIDENT

TUG BOAT CLARKSTON/SOFT PATCH FAILURE

INCIDENT DETAILS

Platform Rig Name:

Platform Letter:

Location Area ID:

Location Block ID:

OCSG Number:

OOSP Number:

State Lease Number:

Pier Dock Number:

Berth Slip Number:

---VESSEL INFORMATION---

Name: UNKNOWN NAME1 Number: UNKNOWN Aground: NO

Flag:

Length: Breadth: Draught:

Type: UNKNOWN

Hull Construction:

Fuel Capacity:

Fuel on Board:

Cargo Capacity:

Cargo on Board:

DAMAGES

FATALITIES: UNKN Empl/Crew: Passenger: Occupant:
EVACUATIONS: NO Who Evacuated: Radius/Area:
Damages: NO

<u>Closure Type</u>	<u>Description of Closure</u>	<u>Length of Closure</u>	<u>Direction of Closure</u>
Air:	N		
Road:	N		Major Artery: N
Waterway:	N		
Track:	N		

Passengers Transferred: UNKNOWN
Environmental Impact: UNKNOWN
Media Interest: Community Impact due to Material: NO

REMEDIAL ACTIONS

BOOMS DEPLOYED/ALL MATERIAL IS CONTAINED/CAPACITY IS 20,000/9500-10000GAL WERE ON BOARD/LIGHTERING TO A BARGE/WILL NOTIFY STATE AND USCG
Release Secured: UNKNOWN
Release Rate:
Estimated Release Duration:

WEATHER

ADDITIONAL AGENCIES NOTIFIED

Federal:
State/Local:
State/Local On Scene:
State Agency Number:

NOTIFICATIONS BY NRC

U.S. EPA X SEATTLE (PRIMARY)
20-JAN-94 18:51
MSO PORTLAND, OR (PRIMARY)
20-JAN-94 18:51

ADDITIONAL INFORMATION

*** END INCIDENT REPORT # 217821 ***

NATIONAL RESPONSE CENTER 1-800-424-8802

*** For Public Use ***

Information released to a third party shall comply with any applicable federal and/or state Freedom of Information and Privacy Laws

Incident Report # 276790

INCIDENT DESCRIPTION

*Report taken at 14:46 on 18-JAN-95

Incident Type: VESSEL

Incident Cause: EQUIPMENT FAILURE

Affected Area:

The incident was discovered on 18-JAN-95 at 11:15 local time.

Affected Medium: WATER WILLAMETTE RIVER

SUSPECTED RESPONSIBLE PARTY

Organization: FOSS MARITIME
PORTLAND, OR 97267

Type of Organization: PRIVATE ENTERPRISE

INCIDENT LOCATION

9030 NW ST HELENS County: MULTNOMAH

City: PORTLAND State: OR Zip: 97267

RELEASED MATERIAL(S)

CHRIS Code: ODS Official Material Name: OIL: DIESEL

Also Known As:

Qty Released: 1 QUART(S) Qty in Water: 1 QUART(S)

DESCRIPTION OF INCIDENT

TUGBOAT//MATERIAL RELEASED FM SHAFT ALLEY

INCIDENT DETAILS

Platform Rig Name:
Platform Letter:
Location Area ID:
Location Block ID:
OCSG Number:
OCSP Number:
State Lease Number:
Pier Dock Number:
Berth Slip Number:

---VESSEL INFORMATION---

Name: UNKNOWN NAME1 Number: EARL H Aground: NO
Flag:
Length: Breadth: Draught:
Type: UNKNOWN
Hull Construction:
Fuel Capacity:
Fuel on Board:
Cargo Capacity:
Cargo on Board:

DAMAGES

FATALITIES: UNKN Empl/Crew: Passenger: Occupant:
EVACUATIONS: NO Who Evacuated: Radius/Area:
Damages: NO

<u>Closure Type</u>	<u>Description of Closure</u>	<u>Length of Closure</u>	<u>Direction of Closure</u>
Air:	N		
Road:	N		Major Artery: N
Waterway:	N		
Track:	N		

Passengers Transferred: UNKNOWN
Environmental Impact: UNKNOWN
Media Interest: Community Impact due to Material: NO

REMEDIAL ACTIONS

SECURED RELEASE//SHEEN WAS DISSIPATING
Release Secured: UNKNOWN
Release Rate:
Estimated Release Duration:

WEATHER

ADDITIONAL AGENCIES NOTIFIED

Federal:
State/Local:
State/Local On Scene:
State Agency Number:

NOTIFICATIONS BY NRC

MSO PORTLAND, OR (PRIMARY)
18-JAN-95 14:51

ADDITIONAL INFORMATION

SHEEN SIZE:100FT X 20FT/SILVERY

*** END INCIDENT REPORT # 276790 ***

NATIONAL RESPONSE CENTER 1-800-424-8802

*** For Public Use ***

Information released to a third party shall comply with any applicable federal and/or state Freedom of Information and Privacy Laws

Incident Report # 282583

INCIDENT DESCRIPTION

*Report taken at 10:57 on 09-MAR-95

Incident Type: MOBILE

Incident Cause: EQUIPMENT FAILURE

Affected Area:

The incident occurred on 09-MAR-95 at 06:00 local time.

Affected Medium: WATER ASPHALT>WILLAMETTE RIVER

SUSPECTED RESPONSIBLE PARTY

Organization: FOSS ENVIRONMENTAL SRVCS
PORTLAND, OR 97203

Type of Organization: PRIVATE ENTERPRISE

INCIDENT LOCATION

9030 NW ST HELENS RD County: MULTNOMAH

City: PORTLAND State: OR

RELEASED MATERIAL(S)

CHRIS Code: OHY Official Material Name: HYDRAULIC OIL

Also Known As:

Qty Released: 0 UNKNOWN AMOUNT Qty in Water: 0 UNKNOWN AMOUNT

DESCRIPTION OF INCIDENT

POWER STEERING HOSE BROKE ON VEHICLE CAUSING MATERIAL TO RELEASE

INCIDENT DETAILS

Road Mile Marker:

Length of Service Disruption:

Airbag Deployed:

---MOBILE INFORMATION---

Vehicle Type: UNKNOWN

Vehicle Number: UNKNOWN1 Trailer/Tanker Number:

Vehicle Fuel Capacity:

Cargo Capacity:

Cargo On Board:

Hazmat Carrier: UNKNOWN

Carrier Licensed: UNKNOWN

Suspected Non Compliance: UNKNOWN

DAMAGES

Fire Involved: NO Fire Extinguished:

INJURIES: UNKN Hospitalized: Empl/Crew: Passenger:

FATALITIES: UNKN Empl/Crew: Passenger: Occupant:

EVACUATIONS: NO Who Evacuated: Radius/Area:

Damages: NO

<u>Closure Type</u>	<u>Description of Closure</u>	<u>Closure</u>	<u>Closure</u>
Air:			
Road:			Major Artery:
Waterway:			

Track:

Passengers Transferred: UNKNOWN

Environmental Impact: UNKNOWN

Media Interest: Community Impact due to Material:

REMEDIAL ACTIONS

LESS THAN 1 GALLON RELEASED/SPILL CONTAINED AND ABSORBED

Release Secured:

Release Rate:

Estimated Release Duration:

WEATHER

ADDITIONAL AGENCIES NOTIFIED

Federal:

State/Local:

State/Local On Scene:

State Agency Number:

NOTIFICATIONS BY NRC

ATSDR OR ATTN: LINDA SAMET (PRIMARY)

09-MAR-95 00:00

ATSDR WA ATTN: LUCY HARTER (PRIMARY)

09-MAR-95 00:00

MSO PORTLAND, OR (PRIMARY)

09-MAR-95 11:03

ADDITIONAL INFORMATION

*** END INCIDENT REPORT # 282583 ***

NATIONAL RESPONSE CENTER 1-800-424-8802

*** For Public Use ***

Information released to a third party shall comply with any applicable federal and/or state Freedom of Information and Privacy Laws

Incident Report # 296194

INCIDENT DESCRIPTION

*Report taken at 18:05 on 19-JUN-95

Incident Type: VESSEL

Incident Cause: UNKNOWN

Affected Area:

The incident occurred on 19-JUN-95 at 15:00 local time.

Affected Medium: WATER WILLAMETTE RIVER

SUSPECTED RESPONSIBLE PARTY

Organization: FOSS MARITIME
PORTLAND, OR 97267

Type of Organization: PRIVATE ENTERPRISE

INCIDENT LOCATION

9030 NW ST HELENS County: MULTNOMAH

City: PORTLAND State: OR Zip: 97267

RELEASED MATERIAL(S)

CHRIS Code: ODS Official Material Name: OIL: DIESEL

Also Known As:

Qty Released: 2 GALLON(S) Qty in Water: 2 GALLON(S)

DESCRIPTION OF INCIDENT

TUG KNAPPETON//BILGE//UNKNOWN

INCIDENT DETAILS

Platform Rig Name:

Platform Letter:

Location Area ID:

Location Block ID:

OCSG Number:

OOSP Number:

State Lease Number:

Pier Dock Number:

Berth Slip Number:

---VESSEL INFORMATION---

Name: UNKNOWN NAME1 Number: UNKNOWN Aground: NO

Flag:

Length: Breadth: Draught:

Type: UNKNOWN

Hull Construction:

Fuel Capacity:

Fuel on Board:

Cargo Capacity:

Cargo on Board:

DAMAGES

FATALITIES: UNKN Empl/Crew: Passenger: Occupant:
EVACUATIONS: NO Who Evacuated: Radius/Area:
Damages: NO

<u>Closure Type</u>	<u>Description of Closure</u>	<u>Length of Closure</u>	<u>Direction of Closure</u>
Air:	N		
Road:	N		Major Artery:
Waterway:			
Track:			

Passengers Transferred: UNKNOWN
Environmental Impact: UNKNOWN
Media Interest: Community Impact due to Material:

REMEDIAL ACTIONS

LEAK SECURED//DISSIPATED
Release Secured:
Release Rate:
Estimated Release Duration:

WEATHER

ADDITIONAL AGENCIES NOTIFIED

Federal:
State/Local:
State/Local On Scene:
State Agency Number:

NOTIFICATIONS BY NRC

ATSDR OR ATTN: LINDA SAMET (PRIMARY)
19-JUN-95 00:00
ATSDR WA ATTN: LUCY HARTER (PRIMARY)
19-JUN-95 00:00
U.S. EPA X SEATTLE (PRIMARY)
19-JUN-95 18:14
MSO PORTLAND, OR (PRIMARY)
19-JUN-95 18:09

ADDITIONAL INFORMATION

*** END INCIDENT REPORT # 296194 ***

NATIONAL RESPONSE CENTER 1-800-424-8802

*** For Public Use ***

Information released to a third party shall comply with any applicable federal and/or state Freedom of Information and Privacy Laws

Incident Report # 299973

INCIDENT DESCRIPTION

*Report taken at 06:49 on 15-JUL-95

Incident Type: VESSEL

Incident Cause: EQUIPMENT FAILURE

Affected Area:

The incident occurred on 15-JUL-95 at 03:30 local time.

Affected Medium: WATER WILLAMETTE RIVER

SUSPECTED RESPONSIBLE PARTY

Organization: FOSS MARITIME
PORTLAND, OR 97267

Type of Organization: PRIVATE ENTERPRISE

INCIDENT LOCATION

9030 NW ST HELENS County: MULTNOMAH

City: PORTLAND State: OR Zip: 97267

RELEASED MATERIAL(S)

CHRIS Code: ODS Official Material Name: OIL: DIESEL

Also Known As:

Qty Released: 5 GALLON(S) Qty in Water: 5 GALLON(S)

DESCRIPTION OF INCIDENT

TUG LEWISTON/FUEL CAME OUT OF A VENT

INCIDENT DETAILS

Platform Rig Name:

Platform Letter:

Location Area ID:

Location Block ID:

OCSG Number:

OCSF Number:

State Lease Number:

Pier Dock Number:

Berth Slip Number:

---VESSEL INFORMATION---

Name: UNKNOWN NAME1 Number: UNKNOWN Aground: NO

Flag:

Length: Breadth: Draught:

Type: UNKNOWN

Hull Construction:

Fuel Capacity:

Fuel on Board:

Cargo Capacity:

Cargo on Board:

DAMAGES

FATALITIES: UNKN Empl/Crew: Passenger: Occupant:
EVACUATIONS: NO Who Evacuated: Radius/Area:
Damages: NO

<u>Closure Type</u>	<u>Description of Closure</u>	<u>Length of Closure</u>	<u>Direction of Closure</u>	
Air:	N			
Road:	N			Major Artery:
Waterway:				

Track:

Passengers Transferred: UNKNOWN
Environmental Impact: UNKNOWN
Media Interest: Community Impact due to Material:

REMEDIAL ACTIONS

CONTRACTORS ARE ON THE WAY/SPILL HAS BEEN CONTAINED WITH BOOMS
Release Secured:
Release Rate:
Estimated Release Duration:

WEATHER

ADDITIONAL AGENCIES NOTIFIED

Federal:
State/Local:
State/Local On Scene:
State Agency Number:

NOTIFICATIONS BY NRC

ATSDR OR ATTN: LINDA SAMET (PRIMARY)
15-JUL-95 00:00
ATSDR WA ATTN: LUCY HARTER (PRIMARY)
15-JUL-95 00:00
MSO PORTLAND, OR (PRIMARY)
15-JUL-95 06:53

ADDITIONAL INFORMATION

*** END INCIDENT REPORT # 299973 ***

NATIONAL RESPONSE CENTER 1-800-424-8802

*** For Public Use ***

Information released to a third party shall comply with any applicable federal and/or state Freedom of Information and Privacy Laws

Incident Report # 311030

INCIDENT DESCRIPTION

*Report taken at 20:04 on 16-OCT-95

Incident Type: VESSEL

Incident Cause: EQUIPMENT FAILURE

Affected Area:

The incident was discovered on 16-OCT-95 at 17:00 local time.

Affected Medium: WATER WILLIAMETTE RIVER LEADING TO COLUMBIA RIV

SUSPECTED RESPONSIBLE PARTY

Organization: FOSS MARITIME
PORTLAND, OR 97267

Type of Organization: PRIVATE ENTERPRISE

INCIDENT LOCATION

PACIFIC NORTHERN OIL County: MULTNOMAH

ST HELENS RD

WILLIAMETTE RIVER

City: PORTLAND State: OR Zip: 97267

RELEASED MATERIAL(S)

CHRIS Code: ODS Official Material Name: OIL: DIESEL

Also Known As:

Qty Released: 0 UNKNOWN AMOUNT

Qty in Water: 0 UNKNOWN AMOUNT

DESCRIPTION OF INCIDENT

OIL BARGE BMC4/CRACK IN THE WELD OF THE HULL

INCIDENT DETAILS

Platform Rig Name:

Platform Letter:

Location Area ID:

Location Block ID:

OCSG Number:

OOSP Number:

State Lease Number:

Pier Dock Number:

Berth Slip Number:

---VESSEL INFORMATION---

Name: UNKNOWN NAME1 Number: UNKNOWN Aground: NO

Flag:

Length: Breadth: Draught:

Type: UNKNOWN

Hull Construction:

Fuel Capacity:

Fuel on Board:

Cargo Capacity:

Cargo on Board:

Fire Involved: NO Fire Extinguished: UNKNOWN
INJURIES: UNKN Hospitalized: Empl/Crew: Passenger:
FATALITIES: UNKN Empl/Crew: Passenger: Occupant:
EVACUATIONS: NO Who Evacuated: Radius/Area:

Damages: NO

<u>Closure Type</u>	<u>Description of Closure</u>	<u>Length of Closure</u>	<u>Direction of Closure</u>
Air:	N		
Road:	N		Major Artery: N
Waterway:	N		
Track:	N		

Passengers Transferred: UNKNOWN
Environmental Impact: UNKNOWN
Media Interest: Community Impact due to Material: NO

REMEDIAL ACTIONS

PRODUCT BEING REMOVED FROM ONE TANK TO ANOTHER TANK/CLEANUP CREW ONSCENE
Release Secured: UNKNOWN
Release Rate:
Estimated Release Duration:

WEATHER

ADDITIONAL AGENCIES NOTIFIED

Federal:
State/Local:
State/Local On Scene:
State Agency Number:

NOTIFICATIONS BY NRC

ATSDR OR ATTN: LINDA SAMET (PRIMARY)
 16-OCT-95 00:00
ATSDR WA ATTN: LUCY HARTER (PRIMARY)
 16-OCT-95 00:00
MSO PORTLAND, OR (PRIMARY)
 16-OCT-95 20:11
NOAA RPTS RGN X (1ST CLASS BB) (PRIMARY)
 16-OCT-95 00:00

ADDITIONAL INFORMATION

SHEEN SIZE:UNKNOWN

*** END INCIDENT REPORT # 311030 ***

NATIONAL RESPONSE CENTER 1-800-424-8802

*** For Public Use ***

Information released to a third party shall comply with any applicable federal and/or state Freedom of Information and Privacy Laws

Incident Report # 322009

INCIDENT DESCRIPTION

*Report taken at 14:46 on 24-JAN-96

Incident Type: VESSEL

Incident Cause: EQUIPMENT FAILURE

Affected Area:

The incident occurred on 24-JAN-96 at 11:20 local time.

Affected Medium: WATER WILLAMETTE RIVER

SUSPECTED RESPONSIBLE PARTY

Organization: FOSS MARITIME
PORTLAND, OR 97267

Type of Organization: PRIVATE ENTERPRISE

INCIDENT LOCATION

9030 NW ST HELENS County: MULTNOMAH

MOORAGE FACILITY

City: PORTLAND State: OR Zip: 97267

RELEASED MATERIAL(S)

CHRIS Code: OWA Official Material Name: WASTE OIL

Also Known As:

Qty Released: .5 GALLON(S) Qty in Water: .5 GALLON(S)

DESCRIPTION OF INCIDENT

SHOP BARGE BILGE PUMP/HOSE CAP CAME OFF/RESIDUAL OIL DRIPPED OUT

INCIDENT DETAILS

Platform Rig Name:

Platform Letter:

Location Area ID:

Location Block ID:

OCSG Number:

OOSP Number:

State Lease Number:

Pier Dock Number:

Berth Slip Number:

---VESSEL INFORMATION---

Name: UNKNOWN NAME1 Number: UNKNOWN Aground: NO

Flag:

Length: Breadth: Draught:

Type: UNKNOWN

Hull Construction:

Fuel Capacity:

Fuel on Board:

Cargo Capacity:

Cargo on Board:

INJURIES: UNKN Hospitalized: Empl/Crew: Passenger:
FATALITIES: UNKN Empl/Crew: Passenger: Occupant:
EVACUATIONS: NO Who Evacuated: Radius/Area:
Damages: NO

Closure Type	Description of Closure	Length of Closure	Direction of Closure
Air:	N		
Road:	N		Major Artery: N
Waterway:	N		
Track:	N		

Passengers Transferred: UNKNOWN
Environmental Impact: UNKNOWN
Media Interest: Community Impact due to Material: NO

REMEDIAL ACTIONS

SECURED RELEASE/APPLIED ABSORBENTS/DEPLOYED BOOM
Release Secured: UNKNOWN
Release Rate:
Estimated Release Duration:

WEATHER

ADDITIONAL AGENCIES NOTIFIED

Federal:
State/Local:
State/Local On Scene:
State Agency Number:

NOTIFICATIONS BY NRC

ATSDR OR ATTN: LINDA SAMET (PRIMARY)
24-JAN-96 00:00
ATSDR WA ATTN: LUCY HARTER (PRIMARY)
24-JAN-96 00:00
MSO PORTLAND, OR (PRIMARY)
24-JAN-96 14:49
NOAA RPTS RGN X (1ST CLASS BB) (PRIMARY)
24-JAN-96 00:00

ADDITIONAL INFORMATION

SHEEN SIZE:15FT X 40FTWILL NOTIFY:FORMS

*** END INCIDENT REPORT # 322009 ***

NATIONAL RESPONSE CENTER 1-800-424-8802

*** For Public Use ***

Information released to a third party shall comply with any applicable federal and/or state Freedom of Information and Privacy Laws

Incident Report # 333560

INCIDENT DESCRIPTION

*Report taken at 17:40 on 27-MAR-96

Incident Type: VESSEL

Incident Cause: OTHER

Affected Area:

The incident occurred on 27-MAR-96 at 14:25 local time.

Affected Medium: WATER WILLAMETTE RIVER

SUSPECTED RESPONSIBLE PARTY

Organization: FOSS MARITIME
PORTLAND, OR 97267

Type of Organization: PRIVATE ENTERPRISE

INCIDENT LOCATION

TERMINAL 4 County: MULTNOMAH

BERTH 411

PORT OF PORTLAND

City: PORTLAND State: OR Zip: 97267

RELEASED MATERIAL(S)

CHRIS Code: OTD Official Material Name: OIL, FUEL: NO. 2-D

Also Known As:

Qty Released: 1 GALLON(S) Qty in Water: 1 GALLON(S)

DESCRIPTION OF INCIDENT

M/V ANSAC ASIA/DURING FUEL TRANSFER A FUEL TANK WAS OVER FILLED

INCIDENT DETAILS

Platform Rig Name:

Platform Letter:

Location Area ID:

Location Block ID:

OCSG Number:

OOSP Number:

State Lease Number:

Pier Dock Number:

Berth Slip Number:

---VESSEL INFORMATION---

Name: UNKNOWN NAME1 Number: UNKNOWN Aground: NO

Flag:

Length: Breadth: Draught:

Type: UNKNOWN

Hull Construction:

Fuel Capacity:

Fuel on Board:

Cargo Capacity:

Cargo on Board:

Fire Involved: NO Fire Extinguished: UNKNOWN
INJURIES: UNKN Hospitalized: Empl/Crew: Passenger:
FATALITIES: UNKN Empl/Crew: Passenger: Occupant:
EVACUATIONS: NO Who Evacuated: Radius/Area:
Damages: NO

<u>Closure Type</u>	<u>Description of Closure</u>	<u>Length of Closure</u>	<u>Direction of Closure</u>
Air:	N		
Road:	N		Major Artery: N
Waterway:	N		
Track:	N		

Passengers Transferred: UNKNOWN
Environmental Impact: UNKNOWN
Media Interest: Community Impact due to Material: NO

REMEDIAL ACTIONS

LEAK WAS SECURED/USED SORBENTS TO RECOVER
Release Secured: UNKNOWN
Release Rate:
Estimated Release Duration:

WEATHER

ADDITIONAL AGENCIES NOTIFIED

Federal:
State/Local:
State/Local On Scene:
State Agency Number:

NOTIFICATIONS BY NRC

ATSDR OR ATTN: LINDA SAMET (PRIMARY)
27-MAR-96 00:00
ATSDR WA ATTN: LUCY HARTER (PRIMARY)
27-MAR-96 00:00
NATIONAL RESPONSE CENTER HQ (PRIMARY)
15-OCT-03 18:04
MSO PORTLAND, OR (PRIMARY)
27-MAR-96 17:45
NOAA RPTS RGN X (1ST CLASS BB) (PRIMARY)
27-MAR-96 00:00

ADDITIONAL INFORMATION

SHEEN SIZE:UNKNOWN/COLOR:RAINBOWWILL NOTIFY:RESPONSE SYSTEM

*** END INCIDENT REPORT # 333560 ***

NATIONAL RESPONSE CENTER 1-800-424-8802

*** For Public Use ***

Information released to a third party shall comply with any applicable federal and/or state Freedom of Information and Privacy Laws

Incident Report # 333665

INCIDENT DESCRIPTION

*Report taken at 10:42 on 28-MAR-96

Incident Type: FIXED

Incident Cause: EQUIPMENT FAILURE

Affected Area:

The incident occurred on 28-MAR-96 at 07:35 local time.

Affected Medium: WATER WILLAMETTE RIVER

SUSPECTED RESPONSIBLE PARTY

Organization: FOSS MARITIME
PORTLAND, OR 97267

Type of Organization: PRIVATE ENTERPRISE

INCIDENT LOCATION

9030 NW ST HELENS County: MULTNOMAH

City: PORTLAND State: OR Zip: 97267

RELEASED MATERIAL(S)

CHRIS Code: OTD Official Material Name: OIL, FUEL: NO. 2-D

Also Known As:

Qty Released: 40 GALLON(S) Qty in Water: 40 GALLON(S)

DESCRIPTION OF INCIDENT

FUEL PUMP / HOSE ON PUMP FAILED

INCIDENT DETAILS

Package: N/A

Building ID:

Type of Fixed Object: UNKNOWN

Power Generating Facility: UNKNOWN

Generating Capacity:

Type of Fuel:

NPDES:

NPDES Compliance: UNKNOWN

DAMAGES

Fire Involved: NO Fire Extinguished: UNKNOWN

INJURIES: UNKN Hospitalized: Empl/Crew: Passenger:

FATALITIES: UNKN Empl/Crew: Passenger: Occupant:

EVACUATIONS: NO Who Evacuated: Radius/Area:

Damages: NO

<u>Closure Type</u>	<u>Description of Closure</u>	<u>Length of Closure</u>	<u>Direction of Closure</u>
Air:	N		
Road:	N		Major

Waterway: N

Track: N

Passengers Transferred: UNKNOWN

Environmental Impact: UNKNOWN

Media Interest: Community Impact due to Material: NO

REMEDIAL ACTIONS

SECURED / BOOMS DEPLOYED / USING ABSORBENTS

Release Secured: UNKNOWN

Release Rate:

Estimated Release Duration:

WEATHER

ADDITIONAL AGENCIES NOTIFIED

Federal:

State/Local:

State/Local On Scene:

State Agency Number:

NOTIFICATIONS BY NRC

ATSDR OR ATTN: LINDA SAMET (PRIMARY)

28-MAR-96 00:00

ATSDR WA ATTN: LUCY HARTER (PRIMARY)

28-MAR-96 00:00

MSO PORTLAND, OR (PRIMARY)

28-MAR-96 10:45

NOAA RPTS RGN X (1ST CLASS BB) (PRIMARY)

28-MAR-96 00:00

ADDITIONAL INFORMATION

WILL NOTIFY:CG

*** END INCIDENT REPORT # 333665 ***

NATIONAL RESPONSE CENTER 1-800-424-8802

*** For Public Use ***

Information released to a third party shall comply with any applicable federal and/or state Freedom of Information and Privacy Laws

Incident Report # 337868

INCIDENT DESCRIPTION

*Report taken at 13:18 on 23-APR-96

Incident Type: FIXED

Incident Cause: UNKNOWN

Affected Area:

The incident was discovered on 23-APR-96 at 10:15 local time.

Affected Medium: WATER WILLAMETTE RIVER

SUSPECTED RESPONSIBLE PARTY

Organization: FOSS MARITIME
PORTLAND, OR 97283

Type of Organization: PRIVATE ENTERPRISE

INCIDENT LOCATION

9030 NW ST HELENS RD County: MULTNOMAH

City: PORTLAND State: OR Zip: 97283

RELEASED MATERIAL(S)

CHRIS Code: NCC Official Material Name: NO CHRIS CODE

Also Known As: CABLE LUBE GREASE

Qty Released: 0 UNKNOWN AMOUNT

Qty in Water: 0 UNKNOWN AMOUNT

DESCRIPTION OF INCIDENT

2-5 GAL DRUMS/DRUMS WERE THROWN INTO A DUMPSTER & RAIN WASHED MATERIAL RESIDUE FROM THE DRUMS INTO THE WATER

INCIDENT DETAILS

Package: N/A

Building ID:

Type of Fixed Object: UNKNOWN

Power Generating Facility: UNKNOWN

Generating Capacity:

Type of Fuel:

NPDES:

NPDES Compliance: UNKNOWN

DAMAGES

Fire Involved: NO Fire Extinguished: UNKNOWN

INJURIES: UNKN Hospitalized: Empl/Crew: Passenger:

FATALITIES: UNKN Empl/Crew: Passenger: Occupant:

EVACUATIONS: NO Who Evacuated: Radius/Area:

Damages: NO

<u>Closure Type</u>	<u>Description of Closure</u>	<u>Length of Closure</u>	<u>Direction of Closure</u>
Air:	N		

Artery:

Waterway: N

Track: N

Passengers Transferred: UNKNOWN

Environmental Impact: UNKNOWN

Media Interest: Community Impact due to Material: NO

REMEDIAL ACTIONS

BUCKETS REMOVED FROM DUMPSTER/MATERIAL CONTAINED/SORBENTS DEPLOYED

Release Secured: UNKNOWN

Release Rate:

Estimated Release Duration:

WEATHER

ADDITIONAL AGENCIES NOTIFIED

Federal:

State/Local:

State/Local On Scene:

State Agency Number:

NOTIFICATIONS BY NRC

ATSDR OR ATTN: LINDA SAMET (PRIMARY)

23-APR-96 00:00

ATSDR WA ATTN: LUCY HARTER (PRIMARY)

23-APR-96 00:00

MSO PORTLAND, OR (PRIMARY)

23-APR-96 13:23

NOAA RPTS RGN X (1ST CLASS BB) (PRIMARY)

23-APR-96 00:00

ADDITIONAL INFORMATION

SHEEN SIZE: 150 FT X 20 FT WILL NOTIFY: CG, OR RESPONSE SYSTEM

*** END INCIDENT REPORT # 337868 ***

NATIONAL RESPONSE CENTER 1-800-424-8802

*** For Public Use ***

Information released to a third party shall comply with any applicable federal and/or state Freedom of Information and Privacy Laws

Incident Report # 359299

INCIDENT DESCRIPTION

*Report taken at 18:32 on 02-SEP-96

Incident Type: VESSEL

Incident Cause: EQUIPMENT FAILURE

Affected Area:

The incident occurred on 02-SEP-96 at 15:20 local time.

Affected Medium: WATER WILLAMETTE RIVER

SUSPECTED RESPONSIBLE PARTY

Organization: FOSS MARITIME
PORTLAND, OR 97267

Type of Organization: PRIVATE ENTERPRISE

INCIDENT LOCATION

9030 NORTHWEST ST HELENS County: MULTNOMAH

RD

City: PORTLAND State: OR

RELEASED MATERIAL(S)

CHRIS Code: ODS Official Material Name: OIL: DIESEL

Also Known As:

Qty Released: 2 GALLON(S) Qty in Water: 2 GALLON(S)

DESCRIPTION OF INCIDENT

TUG BOAT / TUG KNAPPON / SITE GLASS IN ENG ROOM CRACKED AND BILGE PUMP SENT OVERBOARD

INCIDENT DETAILS

Platform Rig Name:

Platform Letter:

Location Area ID:

Location Block ID:

OCSG Number:

OCSF Number:

State Lease Number:

Pier Dock Number:

Berth Slip Number:

---VESSEL INFORMATION---

Name: UNKNOWN NAME1 Number: UNKNOWN Aground: NO

Flag:

Length: Breadth: Draught:

Type: UNKNOWN

Hull Construction:

Fuel Capacity:

Fuel on Board:

Cargo Capacity:

Cargo on Board:

Fire Involved: NO Fire Extinguished: UNKNOWN
INJURIES: UNKN Hospitalized: Empl/Crew: Passenger:
FATALITIES: UNKN Empl/Crew: Passenger: Occupant:
EVACUATIONS: NO Who Evacuated: Radius/Area:
Damages: NO

<u>Closure Type</u>	<u>Description of Closure</u>	<u>Length of Closure</u>	<u>Direction of Closure</u>
Air:	N		
Road:	N		Major Artery: N
Waterway:	N		
Track:	N		

Passengers Transferred: UNKNOWN
Environmental Impact: UNKNOWN
Media Interest: Community Impact due to Material: NO

REMEDIAL ACTIONS

SHUT OFF FEED TO THE SIGHT GLASS / CONTAINED / USED ABSORBENT PADS
Release Secured: UNKNOWN
Release Rate:
Estimated Release Duration:

WEATHER

ADDITIONAL AGENCIES NOTIFIED

Federal:
State/Local:
State/Local On Scene:
State Agency Number:

NOTIFICATIONS BY NRC

ATSDR OR ATTN: LINDA SAMET (PRIMARY)
02-SEP-96 00:00
ATSDR WA ATTN: LUCY HARTER (PRIMARY)
02-SEP-96 00:00
MSO PORTLAND, OR (PRIMARY)
02-SEP-96 18:35
NOAA RPTS RGN X (1ST CLASS BB) (PRIMARY)
02-SEP-96 00:00
OREGON EMERGENCY MANAGEMENT (PRIMARY)
02-SEP-96 00:00
WA STATE EMERGENCY MANAGEMENT (PRIMARY)
02-SEP-96 00:00

ADDITIONAL INFORMATION

SHEEN SIZE: 15FT X 30FT COLOR: RAINBOWWILL NOTIFY: OR RESPONSE SYSTEM

*** END INCIDENT REPORT # 359299 ***

NATIONAL RESPONSE CENTER 1-800-424-8802

*** For Public Use ***

Information released to a third party shall comply with any applicable federal and/or state Freedom of Information and Privacy Laws

Incident Report # 407383

INCIDENT DESCRIPTION

*Report taken at 13:32 on 14-OCT-97

Incident Type: VESSEL

Incident Cause: UNKNOWN

Affected Area:

The incident occurred on 14-OCT-97 at 10:20 local time.

Affected Medium: WATER WILLAMETTE RIVER

SUSPECTED RESPONSIBLE PARTY

Organization: FOSS MARITIME
PORTLAND, OR 97267

Type of Organization: PRIVATE ENTERPRISE

INCIDENT LOCATION

WILLAMETTE RIVER County: MULTNOMAH

MILE 5.5

City: PORTLAND State: OR

RELEASED MATERIAL(S)

CHRIS Code: ODS Official Material Name: OIL: DIESEL

Also Known As:

Qty Released: 0 UNKNOWN AMOUNT Qty in Water: 0 UNKNOWN AMOUNT

DESCRIPTION OF INCIDENT

TUG JIM MOORE / SHEEN APPEARED AROUND TUG AND IS CURRENTLY UNDERINVESTIGATION

INCIDENT DETAILS

Platform Rig Name:

Platform Letter:

Location Area ID:

Location Block ID:

OCSG Number:

OCSF Number:

State Lease Number:

Pier Dock Number:

Berth Slip Number:

---VESSEL INFORMATION---

Name: UNKNOWN NAME1 Number: UNKNOWN Aground: NO

Flag:

Length: Breadth: Draught:

Type: UNKNOWN

Hull Construction:

Fuel Capacity:

Fuel on Board:

Cargo Capacity:

Cargo on Board:

Fire Involved: NO Fire Extinguished: UNKNOWN

INJURIES: UNKN Hospitalized: Empl/Crew: Passenger:

FATALITIES: UNKN Empl/Crew: Passenger: Occupant:

EVACUATIONS: NO Who Evacuated: Radius/Area:

Damages: NO

Closure Type	Description of Closure	Length of Closure	Direction of Closure
Air:	N		
Road:	N		Major Artery: N
Waterway:	N		
Track:	N		

Passengers Transferred: UNKNOWN

Environmental Impact: UNKNOWN

Media Interest: Community Impact due to Material: NO

REMEDIAL ACTIONS

SPILL UNDER INVESTIGATION / IN PROCESS OF BOOMING SHEEN

Release Secured: UNKNOWN

Release Rate:

Estimated Release Duration:

WEATHER

ADDITIONAL AGENCIES NOTIFIED

Federal:

State/Local:

State/Local On Scene:

State Agency Number:

NOTIFICATIONS BY NRC

ATSDR OR ATTN: ELIZABETH ESSEKS (PRIMARY)

14-OCT-97 00:00

ATSDR WA ATTN: LUCY HARTER (PRIMARY)

14-OCT-97 00:00

NOAA 1ST CLASS BE RPTS FOR OR (PRIMARY)

14-OCT-97 00:00

MSO PORTLAND, OR (PRIMARY)

14-OCT-97 13:39

OREGON EMERGENCY MANAGEMENT (PRIMARY)

14-OCT-97 00:00

WA STATE EMERGENCY MANAGEMENT (PRIMARY)

14-OCT-97 00:00

ADDITIONAL INFORMATION

SHEEN SIZE: 50 FT X 15 FTWX: CALM / CLOUDY

*** END INCIDENT REPORT # 407383 ***

NATIONAL RESPONSE CENTER 1-800-424-8802

*** For Public Use ***

Information released to a third party shall comply with any applicable federal and/or state Freedom of Information and Privacy Laws

Incident Report # 419418

INCIDENT DESCRIPTION

*Report taken at 16:16 on 12-JAN-98

Incident Type: VESSEL

Incident Cause: EQUIPMENT FAILURE

Affected Area:

The incident occurred on 12-JAN-98 at 12:40 local time.

Affected Medium: WATER WILLAMETTE RIVER MP06

SUSPECTED RESPONSIBLE PARTY

Organization: FOSS MARITIME
PORTLAND, OR 97267

Type of Organization: PRIVATE ENTERPRISE

INCIDENT LOCATION

9030 NW ST HELENS ROAD County: MULTNOMAH

MP6 WILLAMETTE RIVER

DOCK

City: PORTLAND State: OR Zip: 97267

RELEASED MATERIAL(S)

CHRIS Code: ODS Official Material Name: OIL: DIESEL

Also Known As:

Qty Released: 5 GALLON(S) Qty in Water: 5 GALLON(S)

DESCRIPTION OF INCIDENT

BARGE BMC13 OIL 1 INCH SEPARATOR LINE/LINE BROKE DUE TO FREEZINGWEATHER CONDITIONS

INCIDENT DETAILS

Platform Rig Name:

Platform Letter:

Location Area ID:

Location Block ID:

OCSG Number:

OCSP Number:

State Lease Number:

Pier Dock Number:

Berth Slip Number:

---VESSEL INFORMATION---

Name: UNKNOWN NAME1 Number: UNKNOWN Aground: NO

Flag:

Length: Breadth: Draught:

Type: UNKNOWN

Hull Construction:

Fuel Capacity:

Fuel on Board:

Cargo Capacity:

Cargo on Board:

DAMAGES

Fire Involved: NO Fire Extinguished: UNKNOWN
INJURIES: UNKN Hospitalized: Empl/Crew: Passenger:
FATALITIES: UNKN Empl/Crew: Passenger: Occupant:
EVACUATIONS: NO Who Evacuated: Radius/Area:

Damages: NO

<u>Closure Type</u>	<u>Description of Closure</u>	<u>Length of Closure</u>	<u>Direction of Closure</u>
Air:	N		
Road:	N		Major Artery: N
Waterway:	N		
Track:	N		

Passengers Transferred: UNKNOWN
Environmental Impact: UNKNOWN
Media Interest: Community Impact due to Material: NO

REMEDIAL ACTIONS

SHUT OFF SEPARATOR/RESPONSE CONTRACTOR NOTIFIED.
Release Secured: UNKNOWN
Release Rate:
Estimated Release Duration:

WEATHER

ADDITIONAL AGENCIES NOTIFIED

Federal:
State/Local:
State/Local On Scene:
State Agency Number:

NOTIFICATIONS BY NRC

ATSDR OR ATTN: ELIZABETH ESSEKS (PRIMARY)
 12-JAN-98 00:00
ATSDR WA ATTN: LUCY HARTER (PRIMARY)
 12-JAN-98 00:00
U.S. EPA X SEATTLE (PRIMARY)
 12-JAN-98 16:39
NOAA 1ST CLASS BE RPTS FOR OR (PRIMARY)
 12-JAN-98 00:00
MSO PORTLAND, OR (PRIMARY)
 12-JAN-98 16:45
OREGON EMERGENCY MANAGEMENT (PRIMARY)
 12-JAN-98 00:00
WA STATE EMERGENCY MANAGEMENT (PRIMARY)
 12-JAN-98 00:00

ADDITIONAL INFORMATION

*** END INCIDENT REPORT # 419418 ***

NATIONAL RESPONSE CENTER 1-800-424-8802

*** For Public Use ***

Information released to a third party shall comply with any applicable federal and/or state Freedom of Information and Privacy Laws

Incident Report # 419463

INCIDENT DESCRIPTION

*Report taken at 22:19 on 12-JAN-98

Incident Type: VESSEL

Incident Cause: EQUIPMENT FAILURE

Affected Area:

The incident occurred on 12-JAN-98 at 19:00 local time.

Affected Medium: WATER WILLAMETTE RIVER

SUSPECTED RESPONSIBLE PARTY

Organization: FOSS MARITIME
PORTLAND, OR 97267

Type of Organization: PRIVATE ENTERPRISE

INCIDENT LOCATION

9030 NW ST HELENS ROAD County: MULTNOMAH

City: PORTLAND State: OR Zip: 97267

RELEASED MATERIAL(S)

CHRIS Code: OTH Official Material Name: OTHER OIL

Also Known As:

Qty Released: 25 GALLON(S) Qty in Water: 25 GALLON(S)

DESCRIPTION OF INCIDENT

SHOP BARGE / AUTOMATIC BILGE SYSTEM TURNED ON CREATING A SHEEN

INCIDENT DETAILS

Platform Rig Name:

Platform Letter:

Location Area ID:

Location Block ID:

OCSG Number:

OCSE Number:

State Lease Number:

Pier Dock Number:

Berth Slip Number:

---VESSEL INFORMATION---

Name: UNKNOWN NAME1 Number: UNKNOWN Aground: NO

Flag:

Length: Breadth: Draught:

Type: UNKNOWN

Hull Construction:

Fuel Capacity:

Fuel on Board:

Cargo Capacity:

Cargo on Board:

DAMAGES

FATALITIES: UNKN Empl/Crew: Passenger: Occupant:
EVACUATIONS: NO Who Evacuated: Radius/Area:
Damages: NO

<u>Closure Type</u>	<u>Description of Closure</u>	<u>Length of Closure</u>	<u>Direction of Closure</u>
Air:	N		
Road:	N		Major Artery: N
Waterway:	N		
Track:	N		

Passengers Transferred: UNKNOWN
Environmental Impact: UNKNOWN
Media Interest: Community Impact due to Material: NO

REMEDIAL ACTIONS

RELEASE WAS SECURED / DEPLOYED BOOM AND ABSORBENT PADS TO RECOVER SHEENA CONTRACTOR
WAS HIRED
Release Secured: UNKNOWN
Release Rate:
Estimated Release Duration:

WEATHER

ADDITIONAL AGENCIES NOTIFIED

Federal:
State/Local:
State/Local On Scene:
State Agency Number:

NOTIFICATIONS BY NRC

ATSDR OR ATTN: ELIZABETH ESSEKS (PRIMARY)
12-JAN-98 00:00
ATSDR WA ATTN: LUCY HARTER (PRIMARY)
12-JAN-98 00:00
NOAA 1ST CLASS BE RPTS FOR OR (PRIMARY)
12-JAN-98 00:00
MSO PORTLAND, OR (PRIMARY)
12-JAN-98 22:22
OREGON EMERGENCY MANAGEMENT (PRIMARY)
12-JAN-98 00:00
WA STATE EMERGENCY MANAGEMENT (PRIMARY)
12-JAN-98 00:00

ADDITIONAL INFORMATION

SHEEN SIZE:UNKNOWNWEATHER COND:UNKNOWN

*** END INCIDENT REPORT # 419463 ***

NATIONAL RESPONSE CENTER 1-800-424-8802

*** For Public Use ***

Information released to a third party shall comply with any applicable federal and/or state Freedom of Information and Privacy Laws

Incident Report # 429204

INCIDENT DESCRIPTION

*Report taken at 00:29 on 21-MAR-98

Incident Type: VESSEL

Incident Cause: OPERATOR ERROR

Affected Area:

The incident occurred on 20-MAR-98 at 21:00 local time.

Affected Medium: WATER WILLAMETTE RIVER

SUSPECTED RESPONSIBLE PARTY

Organization: FOSS MARITIME
PORTLAND, OR 97231

Type of Organization: PRIVATE ENTERPRISE

INCIDENT LOCATION

9030 NORTHWEST ST HELENS County: MULTNOMAH

RD

City: PORTLAND State: OR Zip: 97231

RELEASED MATERIAL(S)

CHRIS Code: OLB Official Material Name: OIL, MISC: LUBRICATING

Also Known As:

Qty Released: 5 GALLON(S) Qty in Water: 5 GALLON(S)

DESCRIPTION OF INCIDENT

SOURCE: TUG FAIR WIND/CAUSE: OVERFLOW OF LUBE OIL DURING LOADING OPS

INCIDENT DETAILS

Platform Rig Name:

Platform Letter:

Location Area ID:

Location Block ID:

OCSG Number:

OCSF Number:

State Lease Number:

Pier Dock Number:

Berth Slip Number:

---VESSEL INFORMATION---

Name: UNKNOWN NAME1 Number: UNKNOWN Aground: NO

Flag:

Length: Breadth: Draught:

Type: UNKNOWN

Hull Construction:

Fuel Capacity:

Fuel on Board:

Cargo Capacity:

Cargo on Board:

INJURIES: UNKN Hospitalized: Empl/Crew: Passenger:
FATALITIES: UNKN Empl/Crew: Passenger: Occupant:
EVACUATIONS: NO Who Evacuated: Radius/Area:
Damages: NO

<u>Closure Type</u>	<u>Description of Closure</u>	<u>Length of Closure</u>	<u>Direction of Closure</u>
Air:	N		
Road:	N		Major Artery: N
Waterway:	N		
Track:	N		

Passengers Transferred: UNKNOWN
Environmental Impact: UNKNOWN
Media Interest: Community Impact due to Material: NO

REMEDIAL ACTIONS

BOOMS AND ABSORBENT PADS WERE USED TO CLEAN UP THE SPILL.
Release Secured: UNKNOWN
Release Rate:
Estimated Release Duration:

WEATHER

ADDITIONAL AGENCIES NOTIFIED

Federal:
State/Local:
State/Local On Scene:
State Agency Number:

NOTIFICATIONS BY NRC

ATSDR OR ATTN: ELIZABETH ESSEKS (PRIMARY)
21-MAR-98 00:00
ATSDR WA ATTN: LUCY HARTER (PRIMARY)
21-MAR-98 00:00
NOAA 1ST CLASS BB RPTS FOR OR (PRIMARY)
21-MAR-98 00:00
MSO PORTLAND, OR (PRIMARY)
21-MAR-98 00:36
OREGON EMERGENCY MANAGEMENT (PRIMARY)
21-MAR-98 00:00
WA STATE EMERGENCY MANAGEMENT (PRIMARY)
21-MAR-98 00:00

ADDITIONAL INFORMATION

SHEEN COLOR: GRAY/SHEEN SIZE: 20FT X 40FT/WEATHER: WINDS: CALM/SEAS: CALM

*** END INCIDENT REPORT # 429204 ***

NATIONAL RESPONSE CENTER 1-800-424-8802

*** For Public Use ***

Information released to a third party shall comply with any applicable federal and/or state Freedom of Information and Privacy Laws

Incident Report # 456054

INCIDENT DESCRIPTION

*Report taken at 17:36 on 18-SEP-98

Incident Type: VESSEL

Incident Cause: NATURAL PHENOMENON

Affected Area:

The incident occurred on 18-SEP-98 at 14:20 local time.

Affected Medium: WATER WILLAMETTE RIVER

SUSPECTED RESPONSIBLE PARTY

Organization: FOSS MARITIME
PORTLAND, OR 97267

Type of Organization: PRIVATE ENTERPRISE

INCIDENT LOCATION

9030 NW ST HELENS ROAD County: MULTNOMAH

City: PORTLAND State: OR Zip: 97267

RELEASED MATERIAL(S)

CHRIS Code: OUN Official Material Name: UNKNOWN OIL

Also Known As:

Qty Released: 1 GALLON(S) Qty in Water: 1 GALLON(S)

DESCRIPTION OF INCIDENT

FOSS BARGE 208 / RESIDUAL MATERIAL WAS WASHED OVERBOARD WITH HEAVY RAINS

INCIDENT DETAILS

Platform Rig Name:

Platform Letter:

Location Area ID:

Location Block ID:

OCSG Number:

OCSF Number:

State Lease Number:

Pier Dock Number:

Berth Slip Number:

---VESSEL INFORMATION---

Name: UNKNOWN NAME1 Number: UNKNOWN Aground: NO

Flag:

Length: Breadth: Draught:

Type: UNKNOWN

Hull Construction:

Fuel Capacity:

Fuel on Board:

Cargo Capacity:

Cargo on Board:

DAMAGES

FATALITIES: UNKN Empl/Crew: Passenger: Occupant:
EVACUATIONS: NO Who Evacuated: Radius/Area:
Damages: NO

<u>Closure Type</u>	<u>Description of Closure</u>	<u>Length of Closure</u>	<u>Direction of Closure</u>
Air:	N		
Road:	N		Major Artery: N
Waterway:	N		
Track:	N		

Passengers Transferred: UNKNOWN
Environmental Impact: UNKNOWN
Media Interest: Community Impact due to Material: NO

REMEDIAL ACTIONS

BOOM DEPLOYED / SORBENTS USED ON BARGE AND INTO THE WATER / CONTRACTOR DEPLOYED

Release Secured: UNKNOWN
Release Rate:
Estimated Release Duration:

WEATHER

ADDITIONAL AGENCIES NOTIFIED

Federal:
State/Local:
State/Local On Scene:
State Agency Number:

NOTIFICATIONS BY NRC

ATSDR OR ATTN: ELIZABETH ESSEKS (PRIMARY)
18-SEP-98 00:00
ATSDR WA ATTN: LUCY HARTER (PRIMARY)
18-SEP-98 00:00
NOAA 1ST CLASS BB RPTS FOR OR (PRIMARY)
18-SEP-98 00:00
MSO PORTLAND, OR (PRIMARY)
18-SEP-98 17:41
OREGON EMERGENCY MANAGEMENT (PRIMARY)
18-SEP-98 00:00
WA STATE EMERGENCY MANAGEMENT (PRIMARY)
18-SEP-98 00:00

ADDITIONAL INFORMATION

*** END INCIDENT REPORT # 456054 ***

NATIONAL RESPONSE CENTER 1-800-424-8802

*** For Public Use ***

Information released to a third party shall comply with any applicable federal and/or state Freedom of Information and Privacy Laws

Incident Report # 457770

INCIDENT DESCRIPTION

*Report taken at 10:43 on 30-SEP-98

Incident Type: UNKNOWN SHEEN

Incident Cause: UNKNOWN

Affected Area:

The incident was discovered on 30-SEP-98 at 07:00 local time.

Affected Medium: WATER WILLAMETTE RIVER

SUSPECTED RESPONSIBLE PARTY

Organization: FOSS MARITIME
PORTLAND, OR 97267

Type of Organization: PRIVATE ENTERPRISE

INCIDENT LOCATION

9030 NW ST HELENS ROAD County: MULTNOMAH

City: PORTLAND State: OR Zip: 97267

RELEASED MATERIAL(S)

CHRIS Code: OUN Official Material Name: UNKNOWN OIL

Also Known As:

Qty Released: 0 UNKNOWN AMOUNT Qty in Water: 0 UNKNOWN AMOUNT

DESCRIPTION OF INCIDENT

UNKNOWN / UNKNOWN SHEEN SIGHTING, SHEEN SIZE: 75 YDS X 10 YDSCOLOR: BLUE

INCIDENT DETAILS

Platform Rig Name:

Platform Letter:

Location Area ID:

Location Block ID:

OCSG Number:

OCSF Number:

State Lease Number:

Pier Dock Number:

Berth Slip Number:

DAMAGES

Fire Involved: NO Fire Extinguished: UNKNOWN

INJURIES: UNKN Hospitalized: Empl/Crew: Passenger:

FATALITIES: UNKN Empl/Crew: Passenger: Occupant:

EVACUATIONS: NO Who Evacuated: Radius/Area:

Damages: NO

<u>Closure Type</u>	<u>Description of Closure</u>	<u>Length of Closure</u>	<u>Direction of Closure</u>
Air:	N		

Waterway: N

Artery: N

Track: N

Passengers Transferred: UNKNOWN

Environmental Impact: UNKNOWN

Media Interest: Community Impact due to Material: NO

REMEDIAL ACTIONS

SPILL CONTAINED WITH BOOMS/ABSORBENT PADS / FOSS ENVIRONMENTAL SERVICES EN ROUTE

Release Secured: UNKNOWN

Release Rate:

Estimated Release Duration:

WEATHER

ADDITIONAL AGENCIES NOTIFIED

Federal:

State/Local:

State/Local On Scene:

State Agency Number:

NOTIFICATIONS BY NRC

ATSDR OR ATTN: ELIZABETH ESSEKS (PRIMARY)

30-SEP-98 00:00

ATSDR WA ATTN: LUCY HARTER (PRIMARY)

30-SEP-98 00:00

NOAA 1ST CLASS BE RPTS FOR OR (PRIMARY)

30-SEP-98 00:00

MSO PORTLAND, OR (PRIMARY)

30-SEP-98 10:49

OREGON EMERGENCY MANAGEMENT (PRIMARY)

30-SEP-98 00:00

WA STATE EMERGENCY MANAGEMENT (PRIMARY)

30-SEP-98 00:00

ADDITIONAL INFORMATION

TEMP: 60F / CLOUD COVER: SUNNY / WIND: NONE CALLER WILL NOTIFY: OR DEQ

*** END INCIDENT REPORT # 457770 ***

NATIONAL RESPONSE CENTER 1-800-424-8802

*** For Public Use ***

Information released to a third party shall comply with any applicable federal and/or state Freedom of Information and Privacy Laws

Incident Report # 468694

INCIDENT DESCRIPTION

*Report taken at 18:20 on 23-DEC-98

Incident Type: FIXED

Incident Cause: OTHER

Affected Area:

The incident was discovered on 23-DEC-98 at 15:00 local time.

Affected Medium: WATER WILLAMETTE RIVER

SUSPECTED RESPONSIBLE PARTY

Organization: FOSS MARITIME
PORTLAND, OR 97267

Type of Organization: PRIVATE ENTERPRISE

INCIDENT LOCATION

9030 NW ST HELENS ROAD County: MULTNOMAH

City: PORTLAND State: OR Zip: 97267

RELEASED MATERIAL(S)

CHRIS Code: BSS Official Material Name: BILGE SLOPS

Also Known As:

Qty Released: 5 GALLON(S) Qty in Water: 5 GALLON(S)

DESCRIPTION OF INCIDENT

GROUND HOSE WHICH TRANSFERS DIRTY BILGE WATER TO SHORE STORAGELINE RUPTURED DUE TO FREEZING

INCIDENT DETAILS

Package: N/A

Building ID:

Type of Fixed Object: UNKNOWN

Power Generating Facility: UNKNOWN

Generating Capacity:

Type of Fuel:

NPDES:

NPDES Compliance: UNKNOWN

DAMAGES

Fire Involved: NO Fire Extinguished: UNKNOWN

INJURIES: UNKN Hospitalized: Empl/Crew: Passenger:

FATALITIES: UNKN Empl/Crew: Passenger: Occupant:

EVACUATIONS: NO Who Evacuated: Radius/Area:

Damages: NO

<u>Closure Type</u>	<u>Description of Closure</u>	<u>Length of Closure</u>	<u>Direction of Closure</u>
Air:	N		

Artery:

Waterway: N

Track: N

Passengers Transferred: UNKNOWN

Environmental Impact: UNKNOWN

Media Interest: Community Impact due to Material: NO

REMEDIAL ACTIONS

"FOSS ENVIRONMENTAL" WILL CONDUCT THE CLEAN-UP / MATERIAL IS CONTAINED WITH BOOMS

Release Secured: UNKNOWN

Release Rate:

Estimated Release Duration:

WEATHER

ADDITIONAL AGENCIES NOTIFIED

Federal:

State/Local:

State/Local On Scene:

State Agency Number:

NOTIFICATIONS BY NRC

ATSDR OR ATTN: ELIZABETH ESSEKS (PRIMARY)

23-DEC-98 00:00

ATSDR WA ATTN: LUCY HARTER (PRIMARY)

23-DEC-98 00:00

NOAA 1ST CLASS BB RPTS FOR OR (PRIMARY)

23-DEC-98 00:00

MSO PORTLAND, OR (PRIMARY)

23-DEC-98 18:25

OREGON EMERGENCY MANAGEMENT (PRIMARY)

23-DEC-98 00:00

WA STATE EMERGENCY MANAGEMENT (PRIMARY)

23-DEC-98 00:00

ADDITIONAL INFORMATION

*** END INCIDENT REPORT # 468694 ***

NATIONAL RESPONSE CENTER 1-800-424-8802

*** For Public Use ***

Information released to a third party shall comply with any applicable federal and/or state Freedom of Information and Privacy Laws

Incident Report # 519062

INCIDENT DESCRIPTION

*Report taken at 21:22 on 07-FEB-00

Incident Type: VESSEL

Incident Cause: OTHER

Affected Area: WILLAMETTE RIVER

The incident occurred on 07-FEB-00 at 18:10 local time.

Affected Medium: WATER

SUSPECTED RESPONSIBLE PARTY

Organization: FOSS MARITIME
PORTLAND, OR 97267

Type of Organization: PRIVATE ENTERPRISE

INCIDENT LOCATION

9030 NW ST HELENS ROAD County: MULTNOMAH

City: PORTLAND State: OR Zip: 97267

RELEASED MATERIAL(S)

CHRIS Code: ODS Official Material Name: OIL: DIESEL

Also Known As:

Qty Released: 2 GALLON(S) Qty in Water: 0 UNKNOWN AMOUNT

DESCRIPTION OF INCIDENT

THE MATERIAL BURPED FROM THE SOUNDING TUBE ON THE TUG "LEWISTON" DUE TO UNKNOWN CAUSES

INCIDENT DETAILS

Platform Rig Name:

Platform Letter:

Location Area ID:

Location Block ID:

OCSG Number:

OOSP Number:

State Lease Number:

Pier Dock Number:

Berth Slip Number:

---SHEEN INFORMATION---

Sheen Color:

Sheen Odor Description:

Sheen Travel Direction:

Sheen Size Length: UNK

Sheen Size Width: UNK

---WATER INFORMATION---

Body of Water: WILLAMETTE RIVER

Tributary of:

Nearest River Mile Marker:

Water Supply Contaminated: UNKNOWN

---VESSEL INFORMATION---

Name: LEWISTON Number: 538759 Aground: NO

Place:

Type: BARGE
Hull Construction:
Fuel Capacity:
Fuel on Board:
Cargo Capacity:
Cargo on Board:

DAMAGES

Fire Involved: NO Fire Extinguished: UNKNOWN
INJURIES: NO Hospitalized: Empl/Crew: Passenger:
FATALITIES: NO Empl/Crew: Passenger: Occupant:
EVACUATIONS: NO Who Evacuated: Radius/Area:
Damages: NO

<u>Closure Type</u>	<u>Description of Closure</u>	<u>Length of Closure</u>	<u>Direction of Closure</u>
Air: N			
Road: N			Major Artery: N
Waterway: N			
Track: N			

Passengers Transferred: UNKNOWN
Environmental Impact: UNKNOWN
Media Interest: NONE Community Impact due to Material: NO

REMEDIAL ACTIONS

BOOMS APPLIED, ABSORBENTS APPLIED, MATERIAL CONTAINED, CLEAN UP CREW ON- SITE, CLEAN UP UNDERWAY, CONTRACTOR HAS BEEN HIRED
Release Secured: UNKNOWN
Release Rate:
Estimated Release Duration:

WEATHER

Weather: OVERCAST, 47°F
Wave Condition: 0 CALM

ADDITIONAL AGENCIES NOTIFIED

Federal: USCG
State/Local:
State/Local On Scene:
State Agency Number:

NOTIFICATIONS BY NRC

ATSDR OR ATTN: RICK LEIKER (PRIMARY)
07-FEB-00 21:30
ATSDR WA ATTN: LUCY HARTER (PRIMARY)
07-FEB-00 21:30
NOAA 1ST CLASS BB RPTS FOR OR (PRIMARY)
07-FEB-00 21:30
MSO PORTLAND, OR (PRIMARY)
07-FEB-00 21:34
OREGON EMERGENCY MANAGEMENT (PRIMARY)
07-FEB-00 21:30
WA STATE EMERGENCY MANAGEMENT (PRIMARY)
07-FEB-00 21:30

SHEEN SIZE UNKNOWN DUE TO DARKNESS / WILL NOTIFY THE SERC

*** END INCIDENT REPORT # 519062 ***

NATIONAL RESPONSE CENTER 1-800-424-8802

*** For Public Use ***

Information released to a third party shall comply with any applicable federal and/or state Freedom of Information and Privacy Laws

Incident Report # 530446

INCIDENT DESCRIPTION

*Report taken at 09:11 on 29-MAY-00

Incident Type: VESSEL

Incident Cause: OPERATOR ERROR

Affected Area: WILLAMETTE RIVER

The incident was discovered on 29-MAY-00 at 05:22 local time.

Affected Medium: WATER

SUSPECTED RESPONSIBLE PARTY

Organization: FOSS MARITIME
PORTLAND, OR 97267

Type of Organization: PRIVATE ENTERPRISE

INCIDENT LOCATION

9030 NW ST HELENS ROAD County: MULTNOMAH

City: PORTLAND State: OR Zip: 97267

RELEASED MATERIAL(S)

CHRIS Code: BSS Official Material Name: BILGE SLOPS

Also Known As:

Qty Released: 0 UNKNOWN AMOUNT

Qty in Water: 0 UNKNOWN AMOUNT

DESCRIPTION OF INCIDENT

TUG BOAT "JOSEPH T." / BILGE DISCHARGE DUE TO PUMP WAS NOT TURNED OFF

INCIDENT DETAILS

Platform Rig Name:

Platform Letter:

Location Area ID:

Location Block ID:

OCSG Number:

OCSF Number:

State Lease Number:

Pier Dock Number:

Berth Slip Number:

---SHEEN INFORMATION---

Sheen Color: RAINBOW

Sheen Odor Description:

Sheen Travel Direction:

Sheen Size Length: 50 FEET

Sheen Size Width: 200 FEET

---WATER INFORMATION---

Body of Water: WILLAMETTE RIVER

Tributary of:

Nearest River Mile Marker: 5.5

Water Supply Contaminated: UNKNOWN

---VESSEL INFORMATION---

Name: JOSPEH T Number: 567631 Aground: NO

Flag: UNITED STATES OF AMERICA

Length: 81 Breadth: 28 Draught: 12

Hull Construction: STEEL HULL
Fuel Capacity:
Fuel on Board:
Cargo Capacity:
Cargo on Board:

DAMAGES

Fire Involved: NO Fire Extinguished: UNKNOWN
INJURIES: NO Hospitalized: Empl/Crew: Passenger:
FATALITIES: NO Empl/Crew: Passenger: Occupant:
EVACUATIONS: NO Who Evacuated: Radius/Area:
Damages: NO

<u>Closure Type</u>	<u>Description of Closure</u>	<u>Length of Closure</u>	<u>Direction of Closure</u>
Air:	N		
Road:	N		Major Artery: N
Waterway:	N		
Track:	N		

Passengers Transferred: UNKNOWN
Environmental Impact: UNKNOWN
Media Interest: NONE Community Impact due to Material: NO

REMEDIAL ACTIONS

BILGE PUMP TURNED OFF / SPILL BOOMED AND CONTAINED/ SES CONTRACTOR EN ROUTE

Release Secured: UNKNOWN
Release Rate:
Estimated Release Duration:

WEATHER

Weather: OVERCAST, 50°F

ADDITIONAL AGENCIES NOTIFIED

Federal: MSO PORTLAND, OR
State/Local:
State/Local On Scene:
State Agency Number:

NOTIFICATIONS BY NRC

ATSDR OR ATTN: RICK LEIKER (PRIMARY)
29-MAY-00 09:17
ATSDR WA ATTN: LUCY HARTER (PRIMARY)
29-MAY-00 09:17
NOAA 1ST CLASS BB RPTS FOR OR (PRIMARY)
29-MAY-00 09:17
MSO PORTLAND, OR (PRIMARY)
29-MAY-00 09:20
OREGON EMERGENCY MANAGEMENT (PRIMARY)
29-MAY-00 09:17
WA STATE EMERGENCY MANAGEMENT (PRIMARY)
29-MAY-00 09:17

ADDITIONAL INFORMATION

CALLER HAD NO ADDITIONAL INFORMATION

NATIONAL RESPONSE CENTER 1-800-424-8802

*** For Public Use ***

Information released to a third party shall comply with any applicable federal and/or state Freedom of Information and Privacy Laws

Incident Report # 642772

INCIDENT DESCRIPTION

*Report taken at 12:48 on 21-APR-03

Incident Type: FIXED

Incident Cause: EQUIPMENT FAILURE

Affected Area: MULTNOMAH RIVER

The incident occurred on 21-APR-03 at 09:30 local time.

Affected Medium: WATER MULTNOMAH RIVER > COLUMBIA RIVER

SUSPECTED RESPONSIBLE PARTY

Organization: FOSS MARITIME
PORTLAND, OR 97267

Type of Organization: PRIVATE ENTERPRISE

INCIDENT LOCATION

9030 NW ST BELENS ROAD County: MULTNOMAH
City: PORTLAND State: OR

RELEASED MATERIAL(S)

CHRIS Code: OHY Official Material Name: HYDRAULIC OIL

Also Known As:

Qty Released: 0 UNKNOWN AMOUNT Qty in Water: 0 UNKNOWN AMOUNT

CHRIS Code: OTD Official Material Name: OIL, FUEL: NO. 2-D

Also Known As:

Qty Released: 0 UNKNOWN AMOUNT Qty in Water: 0 UNKNOWN AMOUNT

DESCRIPTION OF INCIDENT

CALLER IS REPORTING MATERIAL RELEASED FROM A PUMP IN A SHAFT ALLEY DUE TO EQUIPMENT FAILURE.

INCIDENT DETAILS

Package: N/A

Building ID:

Type of Fixed Object: OTHER

Power Generating Facility: NO

Generating Capacity:

Type of Fuel:

NPDES:

NPDES Compliance: UNKNOWN

---SHEEN INFORMATION---

Sheen Color: RAINBOW

Sheen Odor Description:

Sheen Travel Direction: S

Sheen Size Length: 100 FEET

Sheen Size Width: 30 FEET

---WATER INFORMATION---

Body of Water: MULTNOMAH RIVER

Tributary of: COLUMBIA RIVER

Nearest River Mile Marker:

Water Supply Contaminated: NO

DAMAGES

Fire Involved: NO Fire Extinguished: UNKNOWN

INJURIES: NO Hospitalized: Empl/Crew: Passenger:

FATALITIES: NO Empl/Crew: Passenger: Occupant:

EVACUATIONS: NO Who Evacuated: Radius/Area:

Damages: NO

Closure Time	Description of Closure	Length of Closure	Direction of Closure
--------------	------------------------	-------------------	----------------------

Air: N
Road: N
Waterway: N
Track: N

Major
Artery: N

Passengers Transferred: UNKNOWN
Environmental Impact: UNKNOWN
Media Interest: NONE Community Impact due to Material: NO

REMEDIAL ACTIONS

BOOMS APPLIED, ABSORBENTS APPLIED, MATERIAL CONTAINED, CLEAN UP UNDERWAY
Release Secured: YES
Release Rate:
Estimated Release Duration: 5 MINUTE

WEATHER

Weather: CLEAR, 50°F
Wave Condition: 0 CALM

ADDITIONAL AGENCIES NOTIFIED

Federal: USCG
State/Local:
State/Local On Scene:
State Agency Number: NO REPORT #

NOTIFICATIONS BY NRC

ATSDR OR ATTN: THEODORA TSONGAS (PRIMARY)
21-APR-03 12:53
ATSDR WA ATTN: LINDA GUNNELLS (PRIMARY)
21-APR-03 12:53
NOAA 1ST CLASS BB RPTS FOR OR (PRIMARY)
21-APR-03 12:53
MSO PORTLAND, OR (PRIMARY)
21-APR-03 12:53
OREGON EMERGENCY MANAGEMENT (PRIMARY)
21-APR-03 12:53
WA STATE EMERGENCY MANAGEMENT (PRIMARY)
21-APR-03 12:53

ADDITIONAL INFORMATION

CALLER HAD NO ADDITIONAL INFORMATION.

*** END INCIDENT REPORT # 642772 ***

NATIONAL RESPONSE CENTER 1-800-424-8802
*** For Public Use ***
Information released to a third party shall comply with any
applicable federal and/or state Freedom of Information and Privacy Laws

Incident Report # 734577

INCIDENT DESCRIPTION

*Report taken at 12:00 on 09-SEP-04
Incident Type: VESSEL
Incident Cause: OPERATOR ERROR
Affected Area: WILLAMETTE RIVER
The incident occurred on 09-SEP-04 at 08:45 local time.
Affected Medium: WATER WILLAMETTE RIVER

SUSPECTED RESPONSIBLE PARTY

Organization: FOSS MARITIME
PORTLAND, OR 97267

Type of Organization: PRIVATE ENTERPRISE

INCIDENT LOCATION

9030 NW ST HELENS ROAD County: MULTNOMAH
City: PORTLAND State: OR Zip: 97267

RELEASED MATERIAL(S)

CHRIS Code: OLB Official Material Name: OIL, MISC: LUBRICATING
Also Known As:
Qty Released: 2 GALLON(S) Qty in Water: 2 GALLON(S)

DESCRIPTION OF INCIDENT

THE CALLER STATED THAT TWO GALLONS OF LUBE OIL WENT INTO THE WATER AFTER
THE STORAGE TANK WAS OVERFILLED. THE STORAGE TANK IS ON A VESSEL.

INCIDENT DETAILS

Platform Rig Name:
Platform Letter:
Location Area ID:
Location Block ID:
OCSE Number:
OCSF Number:
State Lease Number:
Pier Dock Number:
Berth Slip Number:

---SHEEN INFORMATION---

Sheen Color: RAINBOW
Sheen Odor Description:
Sheen Travel Direction:
Sheen Size Length: 75 FEET
Sheen Size Width: 2 FEET

---WATER INFORMATION---

Body of Water: WILLAMETTE RIVER
Tributary of: COLUMBIA RIVER
Nearest River Mile Marker: 5.1
Water Supply Contaminated: NO

---VESSEL INFORMATION---

Name: CAP EVANS Number: 557882 Aground: NO
Flag: UNITED STATES OF AMERICA
Length: 75 Breadth: 25 Draught: 8
Type: TUG
Hull Construction: STEEL HULL
Fuel Capacity:
Fuel on Board:
Cargo Capacity:
Cargo on Board:

DAMAGES

Fire Involved: NO Fire Extinguished: UNKNOWN
INJURIES: NO Hospitalized: Empl/Crew: Passenger:
FATALITIES: NO Empl/Crew: Passenger: Occupant:
EVACUATIONS: NO Who Evacuated: Radius/Area:
Damages: NO

Closure Type	Description of Closure	Length of Closure	Direction of Closure
Air:	N		
Road:	N		Major Artery: N
Waterway:	N		
Track:	N		

Passengers Transferred: UNKNOWN
Environmental Impact: UNKNOWN
Media Interest: NONE Community Impact due to Material: NO

REMEDIAL ACTIONS

CONTAINMENT BOOMS AND ABSORBENT PADS USED
Release Secured: YES
Release Rate:
Estimated Release Duration:

WEATHER

Weather: OVERCAST, 65°F

ADDITIONAL AGENCIES NOTIFIED

Federal: MSO PORTLAND
State/Local:
State/Local On Scene:
State Agency Number:

NOTIFICATIONS BY NRC

ATSDR OR ATTN: THEODORA TSONGAS (PRIMARY)
09-SEP-04 12:05
ATSDR WA ATTN: WAYNE CLIFFORD (PRIMARY)
09-SEP-04 12:05
CG INVESTIGATIVE SERVICE HQ (PRIMARY)
09-SEP-04 12:05
FEMA REGION 10 (PRIMARY)
09-SEP-04 12:05
NOAA 1ST CLASS BB RFTS FOR OR (PRIMARY)
09-SEP-04 12:05
MSO PORTLAND, OR (PRIMARY)
09-SEP-04 12:09
OREGON EMERGENCY MANAGEMENT (PRIMARY)
09-SEP-04 12:05
WA STATE EMERGENCY MANAGEMENT (PRIMARY)
09-SEP-04 12:05

ADDITIONAL INFORMATION

THE CALLER HAD NO ADDITIONAL INFORMATION

*** END INCIDENT REPORT # 734577 ***

GSB -- Seattle

8/12/2008 8:24

PAGE 3/3

Fax Server



Phone: (503) 866-2200
Fax: (503) 378-4381

Secretary of State
Corporation Division
255 Capitol St. NE, Suite 151
Salem, OR 97310-1327
FilingInOregon.com

Assumed Business Name - Amendment

FILED

AUG 14 2008

OREGON
SECRETARY OF STATEREGISTRY NUMBER: 419919-85

In accordance with Oregon Revised Statute 192.410-192.490, the information on this application is public record.
We must release this information to all parties upon request and it will be posted on our website.

For office use only

Please Type or Print Legibly in Black Ink. Attach Additional Sheet if Necessary.

To change business name use new registration, Form 101.

1) ASSUMED BUSINESS NAME: FOSS MARITIME COMPANY

2) DESCRIPTION OF BUSINESS

MARITIME

4) NAME OF AUTHORIZED REPRESENTATIVE (One name only)

CONTINUING ☒ NEW ☐

3) PRINCIPAL PLACE OF BUSINESS (Street address, city, state, zip)

660 W. EWING STREETFRANK H. WILLIAMSON

5) MAILING ADDRESS OF AUTHORIZED REPRESENTATIVE

SEATTLE, WA 98119660 W. EWING STREETSEATTLE, WA 98119

6) REGISTRANTS/OWNERS (List name and publicly available street address of each person or entity who will conduct or transact business under the assumed business name.) (All new registrants must be listed. If registrants are withdrawing, both continuing and withdrawing registrants must be listed.)

NEW REGISTRANTS (Name, Street Address)

CONTINUING REGISTRANTS (Name, Street Address)

WITHDRAWING REGISTRANTS

BRIX MARITIME CO.BRIX MARITIME TOWING, INC.660 W. EWING STREET660 W. EWING STREETSEATTLE, WA 98119SEATTLE, WA 98119

7) COUNTIES

<input checked="" type="checkbox"/> ALL COUNTIES (Statewide)	<input type="checkbox"/> Baker	<input type="checkbox"/> Crook	<input type="checkbox"/> Harney	<input type="checkbox"/> Lake	<input type="checkbox"/> Morrow	<input type="checkbox"/> Union
	<input type="checkbox"/> Benton	<input type="checkbox"/> Curry	<input type="checkbox"/> Hood River	<input type="checkbox"/> Lane	<input type="checkbox"/> Multnomah	<input type="checkbox"/> Wallowa
	<input type="checkbox"/> Clackamas	<input type="checkbox"/> Deschutes	<input type="checkbox"/> Jackson	<input type="checkbox"/> Lincoln	<input type="checkbox"/> Polk	<input type="checkbox"/> Wasco
	<input type="checkbox"/> Clatsop	<input type="checkbox"/> Douglas	<input type="checkbox"/> Jefferson	<input type="checkbox"/> Linn	<input type="checkbox"/> Sherman	<input type="checkbox"/> Washington
	<input type="checkbox"/> Columbia	<input type="checkbox"/> Gilliam	<input type="checkbox"/> Josephine	<input type="checkbox"/> Malheur	<input type="checkbox"/> Tillamook	<input type="checkbox"/> Wheeler
	<input type="checkbox"/> Coos	<input type="checkbox"/> Grant	<input type="checkbox"/> Klamath	<input type="checkbox"/> Marion	<input type="checkbox"/> Umatilla	<input type="checkbox"/> Yamhill

8) SIGNATURES Any change requires a signature. New registrants must sign. If any registrants are WITHDRAWING, withdrawing Registrants or Authorized Representative must sign. If there is a change of Authorized Representative, all registrants must sign.

Brix Maritime Co.

By

Frank H. Williamson

Frank H. Williamson, Secretary

9) CONTACT NAME (To resolve questions with this filing.)

SUSAN L. BRAUNBERGER

DAYTIME PHONE NUMBER (Include area code.)

206.816.1360

FEES

No Processing Fee
Confirmation Copy (Optional) \$5.

**FOSS MARITIME
RECORD CATEGORIES AND RETENTIONS**

(changes are highlighted)

major/minor/category description		vital	retention	COMMENTS
ACCOUNTING (Acct)				
ACCOUNTS PAYABLE (AP)				
	1099 SUMMARY - ANNUAL		CY + 6 Y	
	ACCOUNT RECONCILIATION		CY + 6 Y	
	BATCH BALANCE REPORT (CSR)		CY + 1 Y	
	CHECK REGISTER - AP		CY + 10 Y	
	CONTROL TOTALS REPORT		CY + 1 Y	
	FUEL REPORTS		CY + 6 Y	
	GL INTERFACE REPORT		CY + 4 Y	
	VOUCHERS	V	CY + 6 Y	5/99, changed from cat. Description invoices
	MONTHLY REPORT		CY + 6 Y	
	PURCHASE JOURNAL DISTRIBUTION REPORT		CY + 10 Y	
	TRAVEL & ENTERTAINMENT REPORT		CY + 3 Y	
	USE TAX ACCRUAL REPORT		CY + 6 Y	
	VENDOR TRIAL BALANCE REPORT		CY + 10 Y	
ACCOUNTS RECEIVABLE (AR)				
	AGING		CY + 6 Y	
	BATCH HEADERS (CSR)		CY + 6 Y	
	CASH RECEIPTS	V	CY + 6 Y	
	DEBIT - CREDIT MEMO REPORT		CY + 6 Y	
	DETAIL LEDGER		CY + 10 Y	
	INTERCOMPANY BILLING		CY + 6 Y	
	SALES INVOICES by INVOICE #		CY + 6 Y	
	SALES REGISTER REPORTS		CY + 10 Y	
AUDIT (Audit)				
	WORKPAPERS		CY + 6 Y	
	WORKPAPERS (CSR)		CY + 10 Y	
BANK (Bank)				
	CHECK REGISTERS	V	CY + 10 Y	
	CHECKS CANCELED		CY + 6 Y	
	DEPOSIT SLIPS		CY + 6 Y	
	RECONCILIATIONS		CY + 6 Y	
	STATEMENTS		CY + 6 Y	
FIXED ASSETS (FA)				
	CAPITAL CONSTRUCTION FUND (CCF)		CY + 15 Y	
	CAR DETAIL		CY + 30 Y	7/99, changed retention 20 yrs to 30yrs
	CAR REPORT		CY + 10 Y	
	FIXED ASSET REPORT	V	CY + 20 Y	
GENERAL (General)				
	INSURANCE RECONCILIATIONS		CY + 10 Y	
	VESSEL REPORTS		CY + 10 Y	

FOSS MARITIME
RECORD CATEGORIES AND RETENTIONS
(changes are highlighted)

ACCOUNTING (Acct)			
GENERAL LEDGER (GL)			
	13 MONTH REPORT		CY + 15 Y
	FINANCIAL REPORTS (AMRS & B&O)		CY + 15 Y
	G & A ALLOCATIONS		CY + 10 Y
	JOURNAL VOUCHERS - GL		CY + 10 Y
	MONTHLY REPORT - GL		CY + 10 Y
	RECONCILIATIONS		CY + 6 Y
	VENDOR TRIAL BALANCE		CY + 10 Y
INVENTORY (Inv)			
	COMMISSARY ISSUES		CY + 3 Y
	MATERIAL CONTROL REPORTS		CY + 3 Y
JOB COST (JC)			
	JMS INPUT - EDIT		CY + 6 Y
	JMS PURGE REPORT (YEAR-END)		CY + 6 Y
	JMS REPORTS		CY + 6 Y
	JOB STATUS REPORTS		CY + 6 Y
	M & R REPORT (YEAR END)		CY + 6 Y
	RECONCILIATION ACCRUED LIABILITY		CY + 6 Y
	W.I.P. WORKSHEETS (WORK IN PROGRESS)		CY + 6 Y
PAYROLL (PR)			
	EMPLOYEE MASTER FILE	V	CY + 6 Y
	EMPLOYEE PAYROLL CHANGES		CY + 3 Y
	GARNISHMENT RECORDS		CY + 6 Y
	HISTORY-YTD		CY + 6 Y
	LABOR DISTRIBUTION REPORTS		CY + 3 Y
	PAYROLL CHECKS		CY + 10 Y
	PAYROLL DATA	V	CY + 6 Y
	PAYROLL JOURNAL VOUCHERS		CY + 10 Y
	PENSION & WELFARE REPORTS		CY + 3 Y
	PAYROLL REPORTS/REGISTERS		CY + 10 Y
	TAX REPORTS		CY + 15 Y
	TIMECARDS		CY + 10 Y
	TIMESHEETS (CSR)		CY + 10 Y
	W-2		CY + 6 Y
	W-4		CY + 15 Y
	WIRE TRANSFERS		CY + 6 Y
	WORKMAN'S COMPENSATION (CSR)		CY + 3 Y

3/00, chg'd retention 6 yr to 10 yr, per F. Williamson (same retention as AP checks)

10/97, changed retention 3 yr to 10 yr

**FOSS MARITIME
RECORD CATEGORIES AND RETENTIONS**

(changes are highlighted)

ACCOUNTING (Acct)			
	TAX (Tax)		
	ALASKA INCOME TAX	CY + 10 Y	
	BC SOCIAL SERVICE TAX	CY + 15 Y	
	CALIFORNIA SALES - USE TAX	CY + 10 Y	
	EXCISE TAX RETURN	CY + 10 Y	
	LIABILITY ANALYSIS	CY + 6 Y	
	PACKETS	CY + 20 Y	
	PROPERTY TAX	CY + 10 Y	
	RETURNS	CY + 15 Y	
	STATE INCOME TAX	CY + 15 Y	
	TAXABLE ISSUES	CY + 10 Y	
	TITLE XI RECORDS	CY + 15 Y	
	TRIAL BALANCE	CY + 10 Y	
BILLING			
	CAR SLIP INVOICE (CSR)	CY + 6 Y	
	RAILCAR DEMURRAGE (CSR)	CY + 6 Y	
	RENT-LOG RAFTS (CSR)	CY + 4 Y	
	SALES INVOICES by CUSTOMER #	CY + 6 Y	4/00, chg'd retention 2 yr to 6 yr, per F. Williamson. (Acct Invoice copy by Invoice # retained 6 yr.)
	TANK BARGE PAPERS	CY + 15 Y	10/99, chg'd retention 6 yr to 15 yr, per F. Williamson
CORPORATE			
	ACQUISITION	CY + 50 Y	5/01, chg'd retention 10 yr to 50 yr, per F. Williamson
	ANNUAL REPORTS	CY + 50 Y	5/01, chg'd retention 5 yr to 50 yr, per F. Williamson
	MINUTES	V CY + 50 Y	5/01, chg'd retention 15 yr to 50 yr, per F. Williamson
ENVIRONMENTAL			
	BILLING & DISPOSAL DOCUMENTATION	CY + 6 Y	
	CONTRACTS	CY + 50 Y	10/99, chg'd retention 6 yr to 50 yr, per F. Williamson
	COST STUDIES	CY + 1 Y	
	HAZWOPER CLASS FILES (HAZARDOUS WASTE TRA	CY + 50 Y	
	JOB INVOICES (COPIES)	CY + 1 Y	
	LOGS, VARIOUS	CY + 3 Y	
	SALES RECORDS (MATERIAL SALES, ETC)	CY + 3 Y	
	SPILL RECORDS	CY + 15 Y	
	VESSEL EXERCISE & DRILL RECORDS	CY + 15 Y	
	VESSEL LOGS - ENV	CY + 15 Y	
FACILITIES			
	MAINTENANCE REPORT - OFFICE EQUIPMENT	CY + 3 Y	
FINANCE			
	ADMINISTRATIVE FINANCIAL FILES	CY + 3 Y	
	AUDIT FILES	CY + 10 Y	
	BUDGET/PLAN REPORTS	CY + 15 Y	3/00, new category per F. Williamson

**FOSS MARITIME
RECORD CATEGORIES AND RETENTIONS**

(changes are highlighted)

	CAPITAL CONSTRUCTION FUND (CCF) - Finance	CY + 15 Y	

**FOSS MARITIME
RECORD CATEGORIES AND RETENTIONS**

(changes are highlighted)

HISTORICAL			
	HISTORICAL RECORDS	V	CY + 50 Y
	PHOTOGRAPHS	V	CY + 50 Y
HUMAN RESOURCES (HR)			
BENEFITS			
	INDUSTRIAL RELATIONS BENEFITS		CY + 6 Y
	PAID BENEFITS		CY + 6 Y
	PENSION		CY + 50 Y
	RETIREMENT PLANS		CY + 10 Y
	401K		CY + 50 Y
			4/00, chg'd retention 10 yr to 50 yr, per F. Williamson
GENERAL			
	AFFIRMATIVE ACTION PLAN		CY + 6 Y
	EEO - 1,2 PLANS		CY + 6 Y
	EEO CASES (AFTER TERMINATION)		CY + 6 Y
	MANUALS		CY + 6 Y
	REGULATORY MATTERS-EMPLOYMENT, FAIR PRACT		CY + 6 Y
	TOWBITTS		CY + 30 Y
			6/98, changed retention 1 yr to 6 yr
PERSONNEL ACTION			
	MEDICAL RECORDS-SALARIED	V	CY + 50 Y
	PERSONNEL ACTION FORMS		CY + 3 Y
	PERSONNEL FILES - SALARIED	V	CY + 50 Y
UNION RELATED MATTERS			
	LABOR NEGOTIATIONS		CY + 1 Y
	MASTERS, MATES & PILOTS ACTIONS		CY + 6 Y
	STRIKE CONTINGENCY PLAN		CY + 1 Y
INFORMATION TECHNOLOGY (IT)			
	APPLICATION DOCUMENTATION		CY + 5 Y
	COMPUTER TAPE BACKUP	V	CY + 1 Y
	DISASTER RECOVERY PLAN-MAINFRAME	V	CY + 1 Y
	DISASTER RECOVERY PLAN-MICROCOMPUTER	V	CY + 1 Y
	DISASTER RECOVERY PREPRINTED FORMS	V	CY + 1 Y
	LONG RANGE PLAN		CY + 1 Y
	MICROCOMPUTER HW - SW MANUALS - MEDIA		CY + 4 Y
	MICROCOMPUTER POLICY & PROCEDURES		CY + 1 Y
	PROJECTS - ADMINISTRATION FILES		CY + 5 Y

**FOSS MARITIME
RECORD CATEGORIES AND RETENTIONS**

(changes are highlighted)

LEGAL			
	AFFIDAVITS (CITIZENSHIP) REQUIREMENTS	CY + 1 Y	
	CLOSING DOCUMENTS	CY + 50 Y	
	CONTRACTS/LEASES	CY + 50 Y	10/99, chg'd retention 5 yr to 50 yr, per F. Williamson
	CORRESPONDENCE	CY + 3 Y	
	DEEDS	V CY + 50 Y	
	FINANCIALS	CY + 15 Y	
	FORCLOSURE DOCUMENTS	CY + 6 Y	
	LEASE ABSTRACTS	CY + 1 Y	
	LISTING OF REAL PROPERTY	CY + 1 Y	
	LITIGATION MATTERS	CY + 30 Y	5/00, chg'd retention 10 yr to 30 yr, per F. Williamson
	MORTGAGE DOCUMENTS	CY + 6 Y	
	PLOT MAPS	CY + 15 Y	
	PROJECTS	CY + 5 Y	
	PROPERTY APPRAISALS - DESCRIPTIONS	CY + 50 Y	
	PROPERTY INVENTORY	CY + 50 Y	
	SALE OF DESIGN RIGHTS	CY + 6 Y	
	SALE OF REAL ESTATE	CY + 50 Y	
	SHAREHOLDERS - STOCK INFORMATION (CSR)	CY + 50 Y	6/98, new category
	TITLE, PROPERTY	CY + 50 Y	
	TRADEMARK RECORDS	V CY + 15 Y	
	WARRANTS ARREST	CY + 6 Y	
	ZONING PERMITS	CY + 1 Y	
MARINE PERSONNEL (Marine Per)			
	DRUG TESTING RECORDS, NEGATIVE	CY + 1 Y	
	DRUG TESTING RECORDS, POSITIVE	CY + 5 Y	
	EMPLOYMENT ELIGIBILITY VERIFICATION (I-9)	CY + 15 Y	
	GRIEVANCES	CY + 10 Y	3/00, new category
	LABOR DISTRIBUTION REPORTS	CY + 2 Y	
	LABOR NEGOTIATIONS	CY + 5 Y	
	MEDICAL RECORDS-MARINE	V CY + 50 Y	
	OCEAN CREW LIST	CY + 3 Y	
	PAYROLL REPORTS	CY + 3 Y	
	PAYROLL TRANSACTION	CY + 5 Y	
	PERSONNEL INFORMATION - MISC. MARINE	CY + 5 Y	
	PERSONNEL JACKETS - CASUAL	V CY + 50 Y	
	PERSONNEL JACKETS - MARINE	V CY + 50 Y	
	PERSONNEL JACKETS - SHIPYARD	V CY + 50 Y	
	TIME CARDS	CY + 3 Y	
	TRAVEL RECORDS - FLIGHT INFORMATION SHEET	CY + 1 Y	
MARKETING			
	LINE OF BUSINESS REPORT	CY + 5 Y	
	LONG RANGE PLANS	CY + 5 Y	
	PERFORMANCE REPORTS	CY + 15 Y	
	PRICING FILES	CY + 3 Y	
	PROJECT, FINANCIAL ANALYSIS	CY + 1 Y	

**FOSS MARITIME
RECORD CATEGORIES AND RETENTIONS**

(changes are highlighted)

	VESSEL UTILIZATION		CY + 15 Y	
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**FOSS MARITIME
RECORD CATEGORIES AND RETENTIONS**

(changes are highlighted)

OPERATIONS			
DISPATCH			
	BARGE REPORTS (SCOW RPTS)	CY + 5 Y	
	DISPATCH USERS GUIDE	CY + 2 Y	
	FUEL REPORTS	CY + 6 Y	
	FUEL TICKETS (CSR)	CY + 3 Y	
	LINEHANDLERS LOG	CY + 5 Y	
	MOVE TO ARCHIVES REPORT (FICHE)	CY + 15 Y	
	NIGHT LOGS	CY + 15 Y	
	NIGHT ORDERS	CY + 1 Y	
	OCEAN LOGS	CY + 50 Y	10/99, chg'd retention 5 yr to 50 yr, (s/b same as vessel/voyage logs)
	OPERATING DAY LOGS	CY + 15 Y	
	POSITION REPORTS (NIGHT LOG COPY)	CY + 15 Y	
	SERVICE ORDERS (CSR)	CY + 15 Y	
	SINGLE SIDEBAND LOG-RADIO STATION	CY + 3 Y	
	VESSEL LOGS	V CY + 50 Y	(incls Tank Barge logs)
	VOYAGE LOGS (CSR)	V CY + 50 Y	
ENGINEERING			
	Vessel Design	CY + 30 Y	6/99, new category
LOG			
	CUSTOMER FILE - PROJECT (CSR)	CY + 3 Y	
OIL			
	BILLS OF LADING (CSR)	CY + 6 Y	
	BUNKER ORDER LOGS	CY + 50 Y	3/00, new category
	DISPATCH SCHEDULES (CSR)	CY + 15 Y	
	NOTICE OF TRANSFER OPERATION (CA only)	CY + 50 Y	3/00, new category
	OIL LOAD/DISCHARGE BUNKER PAPERS	CY + 50 Y	4/00, new category
	TANKERMAN LOG SHEETS (CSR)	CY + 15 Y	
VESSEL ADMIN			
	VESSEL ARCHIVES	CY + 50 Y	4/00, chg'd retention 10 yr to 50 yr, per F. Williamson
	VESSEL FILES (incls ABS, Coast Guard, surveys, certificates, etc)	CY + 50 Y	4/00, chg'd retention 10 yr to 50 yr, per F. Williamson
	VESSEL INSPECTION LOGS	CY + 50 Y	3/00, new category
	VESSELS SOLD	CY + 50 Y	4/00, chg'd retention 6 yr to 50 yr, per F. Williamson
	VESSEL SURVEYS	CY + 15 Y	3/00, new category

FOSS MARITIME
RECORD CATEGORIES AND RETENTIONS
(changes are highlighted)

OPERATIONS			
	MGMNT		
	ACQUISITION	CY + 10 Y	
	AMERICAN WATERWAYS OPERATORS	CY + 4 Y	Retention changed from 5 yrs to 4 yrs
	BLUEPRINTS, VESSELS	CY + 50 Y	1/00, added category to Operations (same as Shipyard) 08/00 chgd from 15 to 50 yrs per frank
	Boeing EELV IV Project	CY + 50 Y	11/00, new category per frank/Colleen
	BUDGET ACCOMPLISHMENT CRITICAL ISSUES	CY + 1 Y	
	DECK OFFICERS' MEETING	CY + 10 Y	
	ENGINE LOGS	CY + 50 Y	6/98, new category
	ENHANCED TRACTOR TUG MATERIAL	CY + 15 Y	
	FINANCIAL INFORMATION	CY + 10 Y	
	LABOR NEGOTIATIONS	CY + 10 Y	
	MAINTENANCE & REPAIR RECORDS	CY + 15 Y	
	OIL SPILL RECORDS	CY + 10 Y	
	PLAN	CY + 5 Y	
	PROJECTS	CY + 10 Y	
	SPECIAL SUBJECT MATTER	CY + 4 Y	
	TOWING SAFETY ADVISORY COMMISSION	CY + 10 Y	
	TRC BOARD MEETING PLAN PRESENTATION	CY + 1 Y	
	TUGS & BARGES	CY + 5 Y	
	VESSEL VALUES	CY + 6 Y	
	WASHINGTON REGIONAL MARINE SAFETY COMMIS	CY + 3 Y	
PURCHASING			
	BILLS OF LADING	CY + 6 Y	
	CURRENT VESSEL HISTORY	CY + 1 Y	
	PURCHASE ORDERS	CY + 6 Y	

FOSS MARITIME RECORD CATEGORIES AND RETENTIONS

(changes are highlighted)

RISK MANAGEMENT			
CLAIMS			
	ACCIDENT CARDS (CAPTAIN & SEAMEN)	CY + 5 Y	
	CLAIMS LISTING	CY + 1 Y	
	GENERAL LIABILITY	CY + 30 Y	4/00, chg'd retention 15 yr to 30 yr, per F. Williamson
	HULL & MACHINERY	CY + 30 Y	4/00, chg'd retention 15 yr to 30 yr, per F. Williamson
	INDUSTRIAL INDEMNITY INFORMATION	CY + 6 Y	
	LONGSHORE	CY + 30 Y	
	MASTER CLAIMS LISTING	CY + 30 Y	4/00, chg'd retention 3 yr to 30 yr, per F. Williamson
	NON-MARINE, MISC.	CY + 30 Y	4/00, chg'd retention 15 yr to 30 yr, per F. Williamson
	POLLUTION LIABILITY	CY + 30 Y	
	PROTECTION & INDEMNITY-SEAMEN	CY + 30 Y	
	RISK MANAGEMENT - MISC.	CY + 15 Y	
	TOWERS LIABILITY	CY + 30 Y	4/00, chg'd retention 15 yr to 30 yr, per F. Williamson
ENVIRONMENTAL COMPLIANCE			
	CORRESPONDENCE	CY + 3 Y	5/00, new category
	ENVIRONMENTAL AUDITS	CY + 50 Y	5/00, new category
	HAZARD EXPOSURE RECORDS RISK	CY + 50 Y	
	HAZARD MATERIAL MANAGEMENT	CY + 50 Y	4/00, new category
	HAZARD WASTE MANAGEMENT	CY + 50 Y	3/00, new category
	OREGON DEPT of ENVIRONMENTAL QUALITY	CY + 50 Y	5/00, new category
	PERMIT DOCUMENTS	CY + 50 Y	3/00, new category
	WASHINGTON DEPARTMENT OF ECOLOGY	CY + 50 Y	5/98, new category
GENERAL			
	RISK MANAGEMENT DEPARTMENT DESCRIPTIONS	CY + 6 Y	
INSURANCE			
	CERTIFICATES OF COMPLIANCE	CY + 1 Y	
	CERTIFICATES OF INSURANCE	CY + 50 Y	
	INSURANCE BONDS	CY + 15 Y	
	LIABILITY RECORDS (CSR)	CY + 6 Y	
	POLICIES	V CY + 50 Y	
	RECERTIFICATION	CY + 6 Y	
	CORRESPONDANCE	CY + 3 Y	8/00 new category
SAFETY & QA			
			3/00, M. Sutton added QA to the Safety Cat
	ACCIDENT INVESTIGATIONS AND REVIEWS	CY + 15 Y	
	ASBESTOS SURVEYS	CY + 50 Y	5/00, new category
	HAZARDOUS SUBSTANCE SURVEY	CY + 50 Y	5/00, new category
	HEARING CONSERVATION PROGRAM	CY + 50 Y	5/00, new category
	MSDS	CY + 50 Y	5/00, new category
	OSHA	CY + 50 Y	3/00, new category
	RCP VESSEL DOCUMENTS	CY + 50 Y	
	SAFETY INSPECTIONS	CY + 50 Y	3/00, chg'd retention 5 yr to 50 yr, per F. Williamson
	TRAINING	CY + 30 Y	5/00, new category

**FOSS MARITIME
RECORD CATEGORIES AND RETENTIONS**

(changes are highlighted)

	LED EXPOSURE	CY + 50 Y	8/00 New Category

**FOSS MARITIME
RECORD CATEGORIES AND RETENTIONS**

(changes are highlighted)

SALES			
	OCEAN		
	ASSET REDEPLOYMENT	CY + 1 Y	
	CONTRACTS, LONG TERM	CY + 50 Y	4/00, chg'd retention 6 yr to 50 yr, per F. Williamson
	CONTRACTS, SPECULATIVE	CY + 50 Y	4/00, chg'd retention 6 yr to 50 yr, per F. Williamson
	SPECIAL PROJECTS	CY + 3 Y	
	PNW		
	CONTRACT, PRIVATE CARRIAGE (COPY)	CY + 50 Y	4/00, chg'd retention 6 yr to 50 yr, per F. Williamson
	MARKETSHARE (COMPETITOR INFORMATION)	CY + 10 Y	6/98, changed retention from 3 yr to 10 yr
SHIPYARD			
	BLUEPRINTS, FACILITIES	CY + 15 Y	
	BLUEPRINTS, VESSELS	CY + 50 Y	08/00, per frank chg from 15 to 50yrs
	CAPITAL EXPENDITURES (CSR)	CY + 15 Y	
	COMMERCIAL FILES-MAINTENANCE & REPAIR	CY + 15 Y	
	ENGINE ROOM LOGS	CY + 50 Y	4/00, This Shipyard category is transferred to Operations
	ENGINEERING FILES-ENGINEERING	CY + 3 Y	
	ENGINEERING FILES-MACHINERY	CY + 15 Y	
	ENHANCED TRACTOR TUG INFORMATION	CY + 15 Y	
	FOSS DRY DOCK DOCUMENTS	CY + 50 Y	3/00, new category
	FOSS FILES-CAPITAL APPROPRIATIONS	CY + 15 Y	
	FOSS FILES-CASUALTY	CY + 15 Y	
	FOSS FILES-MAINTENANCE & REPAIR	CY + 15 Y	
	MANPOWER REPORT	CY + 10 Y	
	OIL SAMPLINGS (CSR)	CY + 4 Y	
	REGULATORY REPORTING	CY + 6 Y	
	US DEPT OF TRANSPORTATION-LOAD NOTICE	CY + 1 Y	
TERMINAL			
	CONTRACTS (COPY)-TERMINAL	CY + 50 Y	4/00, chg'd retention 6 yr to 50 yr, per F. Williamson
	CUSTODIAL AGREEMENTS	CY + 6 Y	
	CUSTODIAL VESSEL FILES	CY + 6 Y	
	JOB CUSTOMER'S FILES	CY + 6 Y	
	MOORAGE CUSTOMER FILES	CY + 4 Y	
	STORAGE CUSTOMER FILES	CY + 3 Y	
	TERMINAL MONTHLY REV - COST FILES	CY + 6 Y	
	X-RAYS	CY + 20 Y	

**FOSS MARITIME
RECORD CATEGORIES AND RETENTIONS**

(changes are highlighted)

major/minor/category description		vital	retention	COMMENTS
ACCOUNTING (Acct)				
ACCOUNTS PAYABLE (AP)				
	1099 SUMMARY - ANNUAL		CY + 6 Y	
	ACCOUNT RECONCILIATION		CY + 6 Y	
	BATCH BALANCE REPORT (CSR)		CY + 1 Y	
	CHECK REGISTER - AP		CY + 10 Y	
	CONTROL TOTALS REPORT		CY + 1 Y	
	FUEL REPORTS		CY + 6 Y	
	GL INTERFACE REPORT		CY + 4 Y	
	VOUCHERS	V	CY + 6 Y	5/99, changed from cat. Description invoices
	MONTHLY REPORT		CY + 6 Y	
	PURCHASE JOURNAL DISTRIBUTION REPORT		CY + 10 Y	
	TRAVEL & ENTERTAINMENT REPORT		CY + 3 Y	
	USE TAX ACCRUAL REPORT		CY + 6 Y	
	VENDOR TRIAL BALANCE REPORT		CY + 10 Y	
ACCOUNTS RECEIVABLE (AR)				
	AGING		CY + 6 Y	
	BATCH HEADERS (CSR)		CY + 6 Y	
	CASH RECEIPTS	V	CY + 6 Y	
	DEBIT - CREDIT MEMO REPORT		CY + 6 Y	
	DETAIL LEDGER		CY + 10 Y	
	INTERCOMPANY BILLING		CY + 6 Y	
	SALES INVOICES by INVOICE #		CY + 6 Y	
	SALES REGISTER REPORTS		CY + 10 Y	
AUDIT (Audit)				
	WORKPAPERS		CY + 6 Y	
	WORKPAPERS (CSR)		CY + 10 Y	
BANK (Bank)				
	CHECK REGISTERS	V	CY + 10 Y	
	CHECKS CANCELED		CY + 6 Y	
	DEPOSIT SLIPS		CY + 6 Y	
	RECONCILIATIONS		CY + 6 Y	
	STATEMENTS		CY + 6 Y	
FIXED ASSETS (FA)				
	CAPITAL CONSTRUCTION FUND (CCF)		CY + 15 Y	
	CAR DETAIL		CY + 30 Y	7/99, changed retention 20 yrs to 30yrs
	CAR REPORT		CY + 10 Y	
	FIXED ASSET REPORT	V	CY + 20 Y	
GENERAL (General)				
	INSURANCE RECONCILIATIONS		CY + 10 Y	
	VESSEL REPORTS		CY + 10 Y	

FOSS MARITIME
RECORD CATEGORIES AND RETENTIONS
(changes are highlighted)

ACCOUNTING (Acct)			
GENERAL LEDGER (GL)			
	13 MONTH REPORT		CY + 15 Y
	FINANCIAL REPORTS (AMRS & B&O)		CY + 15 Y
	G & A ALLOCATIONS		CY + 10 Y
	JOURNAL VOUCHERS - GL		CY + 10 Y
	MONTHLY REPORT - GL		CY + 10 Y
	RECONCILIATIONS		CY + 6 Y
	VENDOR TRIAL BALANCE		CY + 10 Y
INVENTORY (Inv)			
	COMMISSARY ISSUES		CY + 3 Y
	MATERIAL CONTROL REPORTS		CY + 3 Y
JOB COST (JC)			
	JMS INPUT - EDIT		CY + 6 Y
	JMS PURGE REPORT (YEAR-END)		CY + 6 Y
	JMS REPORTS		CY + 6 Y
	JOB STATUS REPORTS		CY + 6 Y
	M & R REPORT (YEAR END)		CY + 6 Y
	RECONCILIATION ACCRUED LIABILITY		CY + 6 Y
	W.I.P. WORKSHEETS (WORK IN PROGRESS)		CY + 6 Y
PAYROLL (PR)			
	EMPLOYEE MASTER FILE	V	CY + 6 Y
	EMPLOYEE PAYROLL CHANGES		CY + 3 Y
	GARNISHMENT RECORDS		CY + 6 Y
	HISTORY-YTD		CY + 6 Y
	LABOR DISTRIBUTION REPORTS		CY + 3 Y
	PAYROLL CHECKS		CY + 10 Y
	PAYROLL DATA	V	CY + 6 Y
	PAYROLL JOURNAL VOUCHERS		CY + 10 Y
	PENSION & WELFARE REPORTS		CY + 3 Y
	PAYROLL REPORTS/REGISTERS		CY + 10 Y
	TAX REPORTS		CY + 15 Y
	TIMECARDS		CY + 10 Y
	TIMESHEETS (CSR)		CY + 10 Y
	W-2		CY + 6 Y
	W-4		CY + 15 Y
	WIRE TRANSFERS		CY + 6 Y
	WORKMAN'S COMPENSATION (CSR)		CY + 3 Y

3/00, chg'd retention 6 yr to 10 yr, per F. Williamson (same retention as AP checks)

10/97, changed retention 3 yr to 10 yr

**FOSS MARITIME
RECORD CATEGORIES AND RETENTIONS**

(changes are highlighted)

ACCOUNTING (Acct)			
	TAX (Tax)		
	ALASKA INCOME TAX	CY + 10 Y	
	BC SOCIAL SERVICE TAX	CY + 15 Y	
	CALIFORNIA SALES - USE TAX	CY + 10 Y	
	EXCISE TAX RETURN	CY + 10 Y	
	LIABILITY ANALYSIS	CY + 6 Y	
	PACKETS	CY + 20 Y	
	PROPERTY TAX	CY + 10 Y	
	RETURNS	CY + 15 Y	
	STATE INCOME TAX	CY + 15 Y	
	TAXABLE ISSUES	CY + 10 Y	
	TITLE XI RECORDS	CY + 15 Y	
	TRIAL BALANCE	CY + 10 Y	
BILLING			
	CAR SLIP INVOICE (CSR)	CY + 6 Y	
	RAILCAR DEMURRAGE (CSR)	CY + 6 Y	
	RENT-LOG RAFTS (CSR)	CY + 4 Y	
	SALES INVOICES by CUSTOMER #	CY + 6 Y	4/00, chg'd retention 2 yr to 6 yr, per F. Williamson. (Acct Invoice copy by Invoice # retained 6 yr.)
	TANK BARGE PAPERS	CY + 15 Y	10/99, chg'd retention 6 yr to 15 yr, per F. Williamson
CORPORATE			
	ACQUISITION	CY + 50 Y	5/01, chg'd retention 10 yr to 50 yr, per F. Williamson
	ANNUAL REPORTS	CY + 50 Y	5/01, chg'd retention 5 yr to 50 yr, per F. Williamson
	MINUTES	V CY + 50 Y	5/01, chg'd retention 15 yr to 50 yr, per F. Williamson
ENVIRONMENTAL			
	BILLING & DISPOSAL DOCUMENTATION	CY + 6 Y	
	CONTRACTS	CY + 50 Y	10/99, chg'd retention 6 yr to 50 yr, per F. Williamson
	COST STUDIES	CY + 1 Y	
	HAZWOPER CLASS FILES (HAZARDOUS WASTE TRA	CY + 50 Y	
	JOB INVOICES (COPIES)	CY + 1 Y	
	LOGS, VARIOUS	CY + 3 Y	
	SALES RECORDS (MATERIAL SALES, ETC)	CY + 3 Y	
	SPIILL RECORDS	CY + 15 Y	
	VESSEL EXERCISE & DRILL RECORDS	CY + 15 Y	
	VESSEL LOGS - ENV	CY + 15 Y	
FACILITIES			
	MAINTENANCE REPORT - OFFICE EQUIPMENT	CY + 3 Y	
FINANCE			
	ADMINISTRATIVE FINANCIAL FILES	CY + 3 Y	
	AUDIT FILES	CY + 10 Y	
	BUDGET/PLAN REPORTS	CY + 15 Y	3/00, new category per F. Williamson

**FOSS MARITIME
RECORD CATEGORIES AND RETENTIONS**

(changes are highlighted)

	CAPITAL CONSTRUCTION FUND (CCF) - Finance	CY + 15 Y	

**FOSS MARITIME
RECORD CATEGORIES AND RETENTIONS**

(changes are highlighted)

HISTORICAL			
	HISTORICAL RECORDS	V	CY + 50 Y
	PHOTOGRAPHS	V	CY + 50 Y
HUMAN RESOURCES (HR)			
BENEFITS			
	INDUSTRIAL RELATIONS BENEFITS		CY + 6 Y
	PAID BENEFITS		CY + 6 Y
	PENSION		CY + 50 Y
	RETIREMENT PLANS		CY + 10 Y
	401K		CY + 50 Y
			4/00, chg'd retention 10 yr to 50 yr, per F. Williamson
GENERAL			
	AFFIRMATIVE ACTION PLAN		CY + 6 Y
	EEO - 1,2 PLANS		CY + 6 Y
	EEO CASES (AFTER TERMINATION)		CY + 6 Y
	MANUALS		CY + 6 Y
	REGULATORY MATTERS-EMPLOYMENT, FAIR PRACT		CY + 6 Y
	TOWBITTS		CY + 30 Y
			6/98, changed retention 1 yr to 6 yr
PERSONNEL ACTION			
	MEDICAL RECORDS-SALARIED	V	CY + 50 Y
	PERSONNEL ACTION FORMS		CY + 3 Y
	PERSONNEL FILES - SALARIED	V	CY + 50 Y
UNION RELATED MATTERS			
	LABOR NEGOTIATIONS		CY + 1 Y
	MASTERS, MATES & PILOTS ACTIONS		CY + 6 Y
	STRIKE CONTINGENCY PLAN		CY + 1 Y
INFORMATION TECHNOLOGY (IT)			
	APPLICATION DOCUMENTATION		CY + 5 Y
	COMPUTER TAPE BACKUP	V	CY + 1 Y
	DISASTER RECOVERY PLAN-MAINFRAME	V	CY + 1 Y
	DISASTER RECOVERY PLAN-MICROCOMPUTER	V	CY + 1 Y
	DISASTER RECOVERY PREPRINTED FORMS	V	CY + 1 Y
	LONG RANGE PLAN		CY + 1 Y
	MICROCOMPUTER HW - SW MANUALS - MEDIA		CY + 4 Y
	MICROCOMPUTER POLICY & PROCEDURES		CY + 1 Y
	PROJECTS - ADMINISTRATION FILES		CY + 5 Y

**FOSS MARITIME
RECORD CATEGORIES AND RETENTIONS**

(changes are highlighted)

LEGAL			
	AFFIDAVITS (CITIZENSHIP) REQUIREMENTS	CY + 1 Y	
	CLOSING DOCUMENTS	CY + 50 Y	
	CONTRACTS/LEASES	CY + 50 Y	10/99, chg'd retention 5 yr to 50 yr, per F. Williamson
	CORRESPONDENCE	CY + 3 Y	
	DEEDS	V CY + 50 Y	
	FINANCIALS	CY + 15 Y	
	FORCLOSURE DOCUMENTS	CY + 6 Y	
	LEASE ABSTRACTS	CY + 1 Y	
	LISTING OF REAL PROPERTY	CY + 1 Y	
	LITIGATION MATTERS	CY + 30 Y	5/00, chg'd retention 10 yr to 30 yr, per F. Williamson
	MORTGAGE DOCUMENTS	CY + 6 Y	
	PLOT MAPS	CY + 15 Y	
	PROJECTS	CY + 5 Y	
	PROPERTY APPRAISALS - DESCRIPTIONS	CY + 50 Y	
	PROPERTY INVENTORY	CY + 50 Y	
	SALE OF DESIGN RIGHTS	CY + 6 Y	
	SALE OF REAL ESTATE	CY + 50 Y	
	SHAREHOLDERS - STOCK INFORMATION (CSR)	CY + 50 Y	6/98, new category
	TITLE, PROPERTY	CY + 50 Y	
	TRADEMARK RECORDS	V CY + 15 Y	
	WARRANTS ARREST	CY + 6 Y	
	ZONING PERMITS	CY + 1 Y	
MARINE PERSONNEL (Marine Per)			
	DRUG TESTING RECORDS, NEGATIVE	CY + 1 Y	
	DRUG TESTING RECORDS, POSITIVE	CY + 5 Y	
	EMPLOYMENT ELIGIBILITY VERIFICATION (I-9)	CY + 15 Y	
	GRIEVANCES	CY + 10 Y	3/00, new category
	LABOR DISTRIBUTION REPORTS	CY + 2 Y	
	LABOR NEGOTIATIONS	CY + 5 Y	
	MEDICAL RECORDS-MARINE	V CY + 50 Y	
	OCEAN CREW LIST	CY + 3 Y	
	PAYROLL REPORTS	CY + 3 Y	
	PAYROLL TRANSACTION	CY + 5 Y	
	PERSONNEL INFORMATION - MISC. MARINE	CY + 5 Y	
	PERSONNEL JACKETS - CASUAL	V CY + 50 Y	
	PERSONNEL JACKETS - MARINE	V CY + 50 Y	
	PERSONNEL JACKETS - SHIPYARD	V CY + 50 Y	
	TIME CARDS	CY + 3 Y	
	TRAVEL RECORDS - FLIGHT INFORMATION SHEET	CY + 1 Y	
MARKETING			
	LINE OF BUSINESS REPORT	CY + 5 Y	
	LONG RANGE PLANS	CY + 5 Y	
	PERFORMANCE REPORTS	CY + 15 Y	
	PRICING FILES	CY + 3 Y	
	PROJECT, FINANCIAL ANALYSIS	CY + 1 Y	

**FOSS MARITIME
RECORD CATEGORIES AND RETENTIONS**

(changes are highlighted)

	VESSEL UTILIZATION		CY + 15 Y	
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**FOSS MARITIME
RECORD CATEGORIES AND RETENTIONS**

(changes are highlighted)

OPERATIONS			
DISPATCH			
	BARGE REPORTS (SCOW RPTS)	CY + 5 Y	
	DISPATCH USERS GUIDE	CY + 2 Y	
	FUEL REPORTS	CY + 6 Y	
	FUEL TICKETS (CSR)	CY + 3 Y	
	LINEHANDLERS LOG	CY + 5 Y	
	MOVE TO ARCHIVES REPORT (FICHE)	CY + 15 Y	
	NIGHT LOGS	CY + 15 Y	
	NIGHT ORDERS	CY + 1 Y	
	OCEAN LOGS	CY + 50 Y	10/99, chg'd retention 5 yr to 50 yr, (s/b same as vessel/voyage logs)
	OPERATING DAY LOGS	CY + 15 Y	
	POSITION REPORTS (NIGHT LOG COPY)	CY + 15 Y	
	SERVICE ORDERS (CSR)	CY + 15 Y	
	SINGLE SIDEBAND LOG-RADIO STATION	CY + 3 Y	
	VESSEL LOGS	V CY + 50 Y	(incls Tank Barge logs)
	VOYAGE LOGS (CSR)	V CY + 50 Y	
ENGINEERING			
	Vessel Design	CY + 30 Y	6/99, new category
LOG			
	CUSTOMER FILE - PROJECT (CSR)	CY + 3 Y	
OIL			
	BILLS OF LADING (CSR)	CY + 6 Y	
	BUNKER ORDER LOGS	CY + 50 Y	3/00, new category
	DISPATCH SCHEDULES (CSR)	CY + 15 Y	
	NOTICE OF TRANSFER OPERATION (CA only)	CY + 50 Y	3/00, new category
	OIL LOAD/DISCHARGE BUNKER PAPERS	CY + 50 Y	4/00, new category
	TANKERMAN LOG SHEETS (CSR)	CY + 15 Y	
VESSEL ADMIN			
	VESSEL ARCHIVES	CY + 50 Y	4/00, chg'd retention 10 yr to 50 yr, per F. Williamson
	VESSEL FILES (incls ABS, Coast Guard, surveys, certificates, etc)	CY + 50 Y	4/00, chg'd retention 10 yr to 50 yr, per F. Williamson
	VESSEL INSPECTION LOGS	CY + 50 Y	3/00, new category
	VESSELS SOLD	CY + 50 Y	4/00, chg'd retention 6 yr to 50 yr, per F. Williamson
	VESSEL SURVEYS	CY + 15 Y	3/00, new category

FOSS MARITIME
RECORD CATEGORIES AND RETENTIONS
(changes are highlighted)

OPERATIONS			
	MGMNT		
	ACQUISITION	CY + 10 Y	
	AMERICAN WATERWAYS OPERATORS	CY + 4 Y	Retention changed from 5 yrs to 4 yrs
	BLUEPRINTS, VESSELS	CY + 50 Y	1/00, added category to Operations (same as Shipyard) 08/00 chgd from 15 to 50 yrs per frank
	Boeing EELV IV Project	CY + 50 Y	11/00, new category per frank/Colleen
	BUDGET ACCOMPLISHMENT CRITICAL ISSUES	CY + 1 Y	
	DECK OFFICERS' MEETING	CY + 10 Y	
	ENGINE LOGS	CY + 50 Y	6/98, new category
	ENHANCED TRACTOR TUG MATERIAL	CY + 15 Y	
	FINANCIAL INFORMATION	CY + 10 Y	
	LABOR NEGOTIATIONS	CY + 10 Y	
	MAINTENANCE & REPAIR RECORDS	CY + 15 Y	
	OIL SPILL RECORDS	CY + 10 Y	
	PLAN	CY + 5 Y	
	PROJECTS	CY + 10 Y	
	SPECIAL SUBJECT MATTER	CY + 4 Y	
	TOWING SAFETY ADVISORY COMMISSION	CY + 10 Y	
	TRC BOARD MEETING PLAN PRESENTATION	CY + 1 Y	
	TUGS & BARGES	CY + 5 Y	
	VESSEL VALUES	CY + 6 Y	
	WASHINGTON REGIONAL MARINE SAFETY COMMIS	CY + 3 Y	
PURCHASING			
	BILLS OF LADING	CY + 6 Y	
	CURRENT VESSEL HISTORY	CY + 1 Y	
	PURCHASE ORDERS	CY + 6 Y	

FOSS MARITIME RECORD CATEGORIES AND RETENTIONS

(changes are highlighted)

RISK MANAGEMENT			
CLAIMS			
	ACCIDENT CARDS (CAPTAIN & SEAMEN)	CY + 5 Y	
	CLAIMS LISTING	CY + 1 Y	
	GENERAL LIABILITY	CY + 30 Y	4/00, chg'd retention 15 yr to 30 yr, per F. Williamson
	HULL & MACHINERY	CY + 30 Y	4/00, chg'd retention 15 yr to 30 yr, per F. Williamson
	INDUSTRIAL INDEMNITY INFORMATION	CY + 6 Y	
	LONGSHORE	CY + 30 Y	
	MASTER CLAIMS LISTING	CY + 30 Y	4/00, chg'd retention 3 yr to 30 yr, per F. Williamson
	NON-MARINE, MISC.	CY + 30 Y	4/00, chg'd retention 15 yr to 30 yr, per F. Williamson
	POLLUTION LIABILITY	CY + 30 Y	
	PROTECTION & INDEMNITY-SEAMEN	CY + 30 Y	
	RISK MANAGEMENT - MISC.	CY + 15 Y	
	TOWERS LIABILITY	CY + 30 Y	4/00, chg'd retention 15 yr to 30 yr, per F. Williamson
ENVIRONMENTAL COMPLIANCE			
	CORRESPONDENCE	CY + 3 Y	5/00, new category
	ENVIRONMENTAL AUDITS	CY + 50 Y	5/00, new category
	HAZARD EXPOSURE RECORDS RISK	CY + 50 Y	
	HAZARD MATERIAL MANAGEMENT	CY + 50 Y	4/00, new category
	HAZARD WASTE MANAGEMENT	CY + 50 Y	3/00, new category
	OREGON DEPT of ENVIRONMENTAL QUALITY	CY + 50 Y	5/00, new category
	PERMIT DOCUMENTS	CY + 50 Y	3/00, new category
	WASHINGTON DEPARTMENT OF ECOLOGY	CY + 50 Y	5/98, new category
GENERAL			
	RISK MANAGEMENT DEPARTMENT DESCRIPTIONS	CY + 6 Y	
INSURANCE			
	CERTIFICATES OF COMPLIANCE	CY + 1 Y	
	CERTIFICATES OF INSURANCE	CY + 50 Y	
	INSURANCE BONDS	CY + 15 Y	
	LIABILITY RECORDS (CSR)	CY + 6 Y	
	POLICIES	V CY + 50 Y	
	RECERTIFICATION	CY + 6 Y	
	CORRESPONDANCE	CY + 3 Y	8/00 new category
SAFETY & QA			
	ACCIDENT INVESTIGATIONS AND REVIEWS	CY + 15 Y	3/00, M. Sutton added QA to the Safety Cat
	ASBESTOS SURVEYS	CY + 50 Y	5/00, new category
	HAZARDOUS SUBSTANCE SURVEY	CY + 50 Y	5/00, new category
	HEARING CONSERVATION PROGRAM	CY + 50 Y	5/00, new category
	MSDS	CY + 50 Y	5/00, new category
	OSHA	CY + 50 Y	3/00, new category
	RCP VESSEL DOCUMENTS	CY + 50 Y	
	SAFETY INSPECTIONS	CY + 50 Y	3/00, chg'd retention 5 yr to 50 yr, per F. Williamson
	TRAINING	CY + 30 Y	5/00, new category

**FOSS MARITIME
RECORD CATEGORIES AND RETENTIONS**

(changes are highlighted)

	LED EXPOSURE	CY + 50 Y	8/00 New Category

**FOSS MARITIME
RECORD CATEGORIES AND RETENTIONS**

(changes are highlighted)

SALES			
OCEAN			
	ASSET REDEPLOYMENT	CY + 1 Y	
	CONTRACTS, LONG TERM	CY + 50 Y	4/00, chg'd retention 6 yr to 50 yr, per F. Williamson
	CONTRACTS, SPECULATIVE	CY + 50 Y	4/00, chg'd retention 6 yr to 50 yr, per F. Williamson
	SPECIAL PROJECTS	CY + 3 Y	
PNW			
	CONTRACT, PRIVATE CARRIAGE (COPY)	CY + 50 Y	4/00, chg'd retention 6 yr to 50 yr, per F. Williamson
	MARKETSHARE (COMPETITOR INFORMATION)	CY + 10 Y	6/98, changed retention from 3 yr to 10 yr
SHIPYARD			
	BLUEPRINTS, FACILITIES	CY + 15 Y	
	BLUEPRINTS, VESSELS	CY + 50 Y	08/00 per frank chg from 15 to 50yrs
	CAPITAL EXPENDITURES (CSR)	CY + 15 Y	
	COMMERCIAL FILES-MAINTENANCE & REPAIR	CY + 15 Y	
	ENGINE ROOM LOGS	CY + 50 Y	4/00, This Shipyard category is transferred to Operations
	ENGINEERING FILES-ENGINEERING	CY + 3 Y	
	ENGINEERING FILES-MACHINERY	CY + 15 Y	
	ENHANCED TRACTOR TUG INFORMATION	CY + 15 Y	
	FOSS DRY DOCK DOCUMENTS	CY + 50 Y	3/00, new category
	FOSS FILES-CAPITAL APPROPRIATIONS	CY + 15 Y	
	FOSS FILES-CASUALTY	CY + 15 Y	
	FOSS FILES-MAINTENANCE & REPAIR	CY + 15 Y	
	MANPOWER REPORT	CY + 10 Y	
	OIL SAMPLINGS (CSR)	CY + 4 Y	
	REGULATORY REPORTING	CY + 6 Y	
	US DEPT OF TRANSPORTATION-LOAD NOTICE	CY + 1 Y	
TERMINAL			
	CONTRACTS (COPY)-TERMINAL	CY + 50 Y	4/00, chg'd retention 6 yr to 50 yr, per F. Williamson
	CUSTODIAL AGREEMENTS	CY + 6 Y	
	CUSTODIAL VESSEL FILES	CY + 6 Y	
	JOB CUSTOMER'S FILES	CY + 6 Y	
	MOORAGE CUSTOMER FILES	CY + 4 Y	
	STORAGE CUSTOMER FILES	CY + 3 Y	
	TERMINAL MONTHLY REV - COST FILES	CY + 6 Y	
	X-RAYS	CY + 20 Y	

DEPARTMENT	RECORDS CATEGORY NAME	REVIEW YEARS:	ACTIVE	INACT
ACCOUNTING	ACT . AP . 1099 SUMMARY / ANNUAL		0	6
ACCOUNTING	ACT . AP . ACCOUNT RECONCILIATION		0	6
ACCOUNTING	ACT . AP . BATCH BALANCE REPORT		0	1
ACCOUNTING	ACT . AP . CASH DISBURSEMENTS REGISTER		0	10
ACCOUNTING	ACT . AP . CASH REQUIREMENTS REPORT		0	1
ACCOUNTING	ACT . AP . CHECK COPIES		0	1
ACCOUNTING	ACT . AP . CHECK REGISTER		0	10
ACCOUNTING	ACT . AP . CONTROL TOTALS REPORT		0	1
ACCOUNTING	ACT . AP . CREDIT SLIPS		0	5
ACCOUNTING	ACT . AP . DAILY, WEEKLY REPORT		0	1
ACCOUNTING	ACT . AP . DISBURSEMENT REPORT		0	1
ACCOUNTING	ACT . AP . G/L INTERFACE REPORT		0	1
ACCOUNTING	ACT . AP . INVOICES		0	6
ACCOUNTING	ACT . AP . MASTER FILE CONTROL REPORT		0	1
ACCOUNTING	ACT . AP . MONTHLY REPORT		0	6
ACCOUNTING	ACT . AP . PURCHASE JOURNAL DISTRIBUTION REPORT		0	10
ACCOUNTING	ACT . AP . TRAVEL & ENTERTAINMENT REPORT		0	3
ACCOUNTING	ACT . AP . USE TAX ACCRUAL REPORT		0	6
ACCOUNTING	ACT . AP . VENDOR TRIAL BALANCE REPORT		0	10
ACCOUNTING	ACT . AR . AGING		0	6
ACCOUNTING	ACT . AR . BATCH HEADERS (CSR)		0	6
ACCOUNTING	ACT . AR . CASH RECEIPTS		0	6
ACCOUNTING	ACT . AR . COLLECTION RECORDS		0	6
ACCOUNTING	ACT . AR . DEBIT/CREDIT MEMO REPORT		0	6
ACCOUNTING	ACT . AR . DETAIL LEDGER		0	10
ACCOUNTING	ACT . AR . INTERCOMPANY BILLING		0	6
ACCOUNTING	ACT . AR . SALES INVOICES		0	6
ACCOUNTING	ACT . AR . SALES REGISTER REPORTS		0	10
ACCOUNTING	ACT . AUD . WORKPAPERS		0	6
ACCOUNTING	ACT . AUD . WORKPAPERS (CSR)		0	10
ACCOUNTING	ACT . BANK . CASH DEPOSITS/LOCK BOX		0	6
ACCOUNTING	ACT . BANK . CHECK REGISTERS		0	10
ACCOUNTING	ACT . BANK . CHECKS CANCELED		0	6
ACCOUNTING	ACT . BANK . DEPOSIT SLIPS		0	6
ACCOUNTING	ACT . BANK . PETTY CASH CHECKS (COD'S)		0	6
ACCOUNTING	ACT . BANK . RECONCILIATIONS		0	6
ACCOUNTING	ACT . BANK . STATEMENTS		0	6
ACCOUNTING	ACT . FA . CAPITAL CONSTRUCTION FUND (CCF)		0	15
ACCOUNTING	ACT . FA . CAR DETAIL		0	15
ACCOUNTING	ACT . FA . CAR REPORT		0	10
ACCOUNTING	ACT . FA . FIXED ASSETS REPORT		0	20
ACCOUNTING	ACT . GEN . INSURANCE WORKSHEETS		0	3
ACCOUNTING	ACT . GEN . PREPAID INSURANCE		0	6
ACCOUNTING	ACT . GEN . VESSEL REPORTS		0	10
ACCOUNTING	ACT . GL . 13 MONTH REPORT		0	15
ACCOUNTING	ACT . GL . CHART OF ACCOUNTS AND P.C.		0	10
ACCOUNTING	ACT . GL . FINANCIAL REPORTS (AMRS & B&O)		0	15
ACCOUNTING	ACT . GL . G & A ALLOCATIONS		0	10
ACCOUNTING	ACT . GL . JOURNAL VOUCHERS		0	10
ACCOUNTING	ACT . GL . MONTHLY REPORT		0	10
ACCOUNTING	ACT . GL . RECONCILIATIONS		0	6
ACCOUNTING	ACT . GL . VENDOR TRIAL BALANCES		0	10

ACT. GL. STOCK RECORDS

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DEPARTMENT	RECORDS CATEGORY NAME	REVIEW YEARS:	ACTIVE	INACT
ACCOUNTING	ACT . INV . COMMISSARY ISSUES		0	3
ACCOUNTING	ACT . INV . MATERIAL CONTROL REPORTS		0	3
ACCOUNTING	ACT . JOB COST . JMS INPUT/EDIT		0	6
ACCOUNTING	ACT . JOB COST . JMS PURGE REPORT (YEAR-END)		0	6
ACCOUNTING	ACT . JOB COST . JMS REPORTS		0	6
ACCOUNTING	ACT . JOB COST . JOB STATUS REPORTS		0	6
ACCOUNTING	ACT . JOB COST . M & R REPORT (YEAR END)		0	6
ACCOUNTING	ACT . JOB COST . RECONCILIATION ACCRUED LIABILITY		0	6
ACCOUNTING	ACT . JOB COST . W.I.P WORKSHEETS (WORK IN PROGRESS)		0	6
ACCOUNTING	ACT . PR . CHECKS		0	6
ACCOUNTING	ACT . PR . DIRECT DEPOSIT TRANSMITTAL REPORT		0	6
ACCOUNTING	ACT . PR . EMPLOYEE MASTER FILE		0	6
ACCOUNTING	ACT . PR . EMPLOYEE PAYROLL CHANGES		0	3
ACCOUNTING	ACT . PR . GARNISHMENT RECORDS		0	6
ACCOUNTING	ACT . PR . HISTORY-YTD		0	6
ACCOUNTING	ACT . PR . JOURNAL VOUCHERS		0	10
ACCOUNTING	ACT . PR . LABOR DISTRIBUTION REPORTS		0	3
ACCOUNTING	ACT . PR . PENSION & WELFARE REPORTS		0	3
ACCOUNTING	ACT . PR . REGISTERS, CHECK		0	10
ACCOUNTING	ACT . PR . REGISTERS, COMBINED		0	10
ACCOUNTING	ACT . PR . TAX REPORTS		0	15
ACCOUNTING	ACT . PR . TIMECARDS		0	3
ACCOUNTING	ACT . PR . TIMESHEETS (CSR)		0	10
ACCOUNTING	ACT . PR . W-2		0	6 15
ACCOUNTING	ACT . PR . W-4		0	15
ACCOUNTING	ACT . PR . WIRE TRANSFERS		0	6
ACCOUNTING	ACT . PR . WORKMAN'S COMPENSATION (CSR)		0	3
ACCOUNTING	ACT . TAX . ALASKA INCOME TAX		0	10
ACCOUNTING	ACT . TAX . BC SOCIAL SERVICE TAX		0	15
ACCOUNTING	ACT . TAX . CALIFORNIA SALES/USE TAX		0	10
ACCOUNTING	ACT . TAX . EXCISE TAX RETURN		0	10
ACCOUNTING	ACT . TAX . LIABILITY ANALYSIS		0	6
ACCOUNTING	ACT . TAX . PACKETS		0	10
ACCOUNTING	ACT . TAX . PORT LOG		0	10
ACCOUNTING	ACT . TAX . PROPERTY TAX		0	10
ACCOUNTING	ACT . TAX . RETURNS		0	15
ACCOUNTING	ACT . TAX . STATE INCOME TAX		0	15
ACCOUNTING	ACT . TAX . THEA FOSS LOGS		0	10
ACCOUNTING	ACT . TAX . TITLE XI RECORDS		0	15
ACCOUNTING	ACT . TAX . TRIAL BALANCE		0	10
ACCOUNTING	ACT . TAX . YEAR-END TAX ACCRUAL		0	10
BILLING	BIL . CAR SLIP INVOICE (CSR)		0	6
BILLING	BIL . RAILCAR DEMURRAGE (CSR)		0	6
BILLING	BIL . RENT-LOG RAFTS (CSR)		0	4
BILLING	BIL . SALES INVOICE COPIES		0	2
BILLING	BIL . TANK BARGE PAPERS BUNKERING		0	4 15
CORPORATE	CORP . ANNUAL REPORTS		0	5
CORPORATE	CORP . MINUTES		0	15
ENVIRONMENTAL	ENV . BILLING & DISPOSAL DOCUMENTATION		0	6
ENVIRONMENTAL	ENV . CONTRACTS		0	6
ENVIRONMENTAL	ENV . HAZWOPER CLASS FILES (HAZARDOUS WASTE TRAINING CERTIFICATES)		0	3
ENVIRONMENTAL	ENV . JOB INVOICES (COPIES)		0	1

DEPARTMENT	RECORDS CATEGORY NAME	REVIEW YEARS:	ACTIVE	INACT
ENVIRONMENTAL	ENV . LOGS, VARIOUS		0	3
ENVIRONMENTAL	ENV . SALES RECORDS (MATERIAL SALES, ETC.)		0	3
ENVIRONMENTAL	ENV . SPILL RECORDS		0	15
ENVIRONMENTAL	ENV . VESSEL EXERCISE & DRILL RECORDS		0	15
ENVIRONMENTAL	ENV . VESSEL LOGS		0	15
FACILITIES	FAC . BUILDING FILES		0	3
FACILITIES	FAC . BUILDING PERMITS		0	3
FACILITIES	FAC . FEDERAL REGISTER		0	1
FACILITIES	FAC . MAINTENANCE REPORT/OFFICE EQUIPMENT		0	3
FACILITIES	FAC . USAGE REPORTS (COPIER/TELEPHONE)		0	1
FACILITIES	FAC . WARRANTIES/OFFICE EQUIPMENT		0	6
FINANCE	FIN . ADMINISTRATIVE FINANCIAL FILES		0	3
FINANCE	<i>Act</i> FIN . AUDIT FILES		0	10
FINANCE	FIN . AUDIT STATEMENT		0	10
FINANCE	FIN . BUDGET PLAN		0	6
FINANCE	FIN . CAPITAL CONSTRUCTION FUND (CCF)		0	15
FINANCE	FIN . MORTGAGE		0	1
FINANCE	FIN . PERFORMANCE REPORTS		0	1
FINANCE	FIN . PLANNING RECORDS		0	1
FINANCE	FIN . PROJECTIONS		0	1
FINANCE	FIN . REPORT MARITIME ADMINISTRATION (REPORT 172)		0	5
FINANCE	FIN . STRATEGIC PLAN		0	5
FINANCE	FIN . T-TAGS COMPLIANCE REPORTING		0	1
HISTORICAL	HIST . HISTORICAL RECORDS		0	50
HISTORICAL	HIST . PHOTOGRAPHS		0	50
H. RESOURCES	HR . BEN . DEATH CLAIMS		0	6
H. RESOURCES	HR . BEN . DISABILITY RECORDS		0	6
H. RESOURCES	HR . BEN . EAP (EMPLOYEE ASSISTANCE PLAN)		0	6
H. RESOURCES	HR . BEN . EEO (EQUAL EMPLOYMENT OPPORTUNITY)		0	6
H. RESOURCES	HR . BEN . INCENTIVE PLANS		0	1
H. RESOURCES	HR . BEN . INDUSTRIAL RELATIONS BENEFITS		0	6
H. RESOURCES	HR . BEN . PAID BENEFITS		0	6
H. RESOURCES	HR . BEN . PENSION/PLAN VESTING		0	6
H. RESOURCES	HR . BEN . PREMIUMS		0	1
H. RESOURCES	HR . BEN . RETIREMENT PLANS		0	6
H. RESOURCES	HR . BEN . SERVICE AWARDS	<i>HR TAX 15 yrs</i>	0	1
H. RESOURCES	HR . BEN . TOP MARINER PLAN		0	1
H. RESOURCES	HR . BEN . WORKMEN'S COMPENSATION		0	6
H. RESOURCES	HR . GEN . AFFIRMATIVE ACTION PLAN		0	6
H. RESOURCES	HR . GEN . EEO - 1,2 PLANS		0	6
H. RESOURCES	HR . GEN . EEO CASES (AFTER TERMINATION)		0	6
H. RESOURCES	HR . GEN . REGULATORY MATTERS-EMPLOYMENT, FAIR PRACTICE CASES		0	6
H. RESOURCES	HR . PA . EMPLOYMENT APPLICATIONS/RESUMES		0	3
H. RESOURCES	HR . PA . EMPLOYMENT ELIGIBILITY VERTICATION (1-9)		0	15
H. RESOURCES	HR . PA . MEDICAL RECORDS-SALARIED		0	30
H. RESOURCES	HR . PA . PERSONNEL ACTION FORMS		0	3
H. RESOURCES	HR . PA . PERSONNEL FILES - SALARIED		0	30
H. RESOURCES	HR . URM . ANTITRUST COMPLIANCE GUIDE		0	1
H. RESOURCES	HR . URM . CONTRACTS/AGREEMENTS		0	6
H. RESOURCES	HR . URM . CONTRIBUTIONS		0	5
H. RESOURCES	HR . URM . CORRESPONDENCE		0	1
H. RESOURCES	HR . URM . DISPUTES, LABOR		0	6

DEPARTMENT	RECORDS CATEGORY NAME	REVIEW YEARS:	ACTIVE	INACT
H. RESOURCES	HR . URM . LABOR NEGOTIATIONS		0	1
H. RESOURCES	HR . URM . MASTERS, MATES & PILOTS ACTIONS		0	6
H. RESOURCES	HR . URM . PREVENTIVE LAW PROGRAM		0	1
H. RESOURCES	HR . URM . RELATED MATTERS		0	6
H. RESOURCES	HR . URM . STRIKE CONTINGENCY PLAN		0	1
H. RESOURCES	HR . URM . WITHHOLDING CERTIFICATIONS		0	1
INFO SVCS	IS . APPLICATION DOCUMENTATION		0	1
INFO SVCS	IS . COMPUTER TAPE BACKUP		0	1
INFO SVCS	IS . DISASTER RECOVERY FORMS		0	1
INFO SVCS	IS . DISASTER RECOVERY PLAN-MAINFRAME		0	1
INFO SVCS	IS . DISASTER RECOVERY PLAN-MICROCOMPUTER		0	1
INFO SVCS	IS . LONG RANGE PLAN		0	1
INFO SVCS	IS . MICROCOMPUTER HW/SW MANUALS/MEDIA		0	2
INFO SVCS	IS . MICROCOMPUTER POLICY & PROCEDURES		0	1
INFO SVCS	IS . PROGRAM BACKUP		0	1
INFO SVCS	IS . PROJECTS/ADMINISTRATION FILES		0	5
INFO SVCS	IS . RECORDS DESTRUCTION FORMS		0	5
INFO SVCS	IS . RECORDS PROGRAM POLICY & PROCEDURES		0	10
INFO SVCS	IS . RECORDS RETENTION SCHEDULES		0	1
INFO SVCS	IS . RECORDS TRANSFER FORMS		0	5
LEGAL	LGL . AFFIDAVITS (CITIZENSHIP) REQUIREMENTS		0	1
LEGAL	LGL . CLOSING DOCUMENTS		0	50
LEGAL	LGL . CONTRACTS		0	6
LEGAL	LGL . CORRESPONDENCE		0	3
LEGAL	LGL . DEEDS		0	50
LEGAL	LGL . FINANCIALS		0	15
LEGAL	LGL . FORCLOSURE DOCUMENTS		0	6
LEGAL	LGL . LEASE ABSTRACTS		0	1
LEGAL	LGL . LISTING OF REAL PROPERTY		0	1
LEGAL	LGL . LITIGATION MATTERS		0	6
LEGAL	LGL . MORTGAGE DOCUMENTS		0	6
LEGAL	LGL . PLOT MAPS		0	15
LEGAL	LGL . PROPERTY APPRAISALS/DESCRIPTIONS		0	50
LEGAL	LGL . PROPERTY INVENTORY		0	6
LEGAL	LGL . SALE OF DESIGN RIGHTS		0	6
LEGAL	LGL . SALE OF REAL ESTATE		0	6
LEGAL	LGL . TITLE, PROPERTY		0	15
LEGAL	LGL . TRADEMARK RECORDS		0	15
LEGAL	LGL . WARRANTS ARREST		0	6
LEGAL	LGL . ZONING PERMITS		0	1
MARINE	MAR . DRUG TESTING RECORDS, NEGATIVE		0	1
MARINE	MAR . DRUG TESTING RECORDS, POSITIVE		0	5
MARINE	MAR . EMPLOYMENT ELIGIBILITY VERIFICATION (1-9)		0	15
MARINE	MAR . LABOR DISTRIBUTION REPORTS		0	2
MARINE	MAR . MEDICAL RECORDS-MARINE		0	30
MARINE	MAR . OCEAN CREW LIST		0	3
MARINE	MAR . PAYROLL REPORTS		0	3
MARINE	MAR . PAYROLL TRANSACTION		0	5
MARINE	MAR . PERSONNEL JACKETS/CASUAL		0	30
MARINE	MAR . PERSONNEL JACKETS/MARINE		0	30
MARINE	MAR . PERSONNEL JACKETS/SHIPYARD		0	30
MARINE	MAR . TIME CARDS		0	3

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DEPARTMENT	RECORDS CATEGORY NAME	REVIEW YEARS:	ACTIVE	INACT
MARINE	MAR . TRAVEL RECORDS/FLIGHT INFORMATION SHEETS		0	1
MARKETING	MKT . LINE OF BUSINESS REPORT		0	5
MARKETING	MKT . LONG RANGE PLANS		0	5
MARKETING	MKT . MARKET SHARE		0	3
MARKETING	MKT . PERFORMANCE REPORTS		0	15
MARKETING	MKT . PRICING FILES		0	3
MARKETING	MKT . PROJECT, FINANCIAL ANALYSIS		0	1
MARKETING	MKT . UNDER ACHIEVING ASSET REPORT		0	1
MARKETING	MKT . VESSEL UTILIZATION		0	15
OPERATIONS	DISP . BARGE REPORTS (SCOW RPTS)		0	5
OPERATIONS	DISP . FUEL REPORTS		0	6
OPERATIONS	DISP . FUEL TICKETS (CSR)		0	3
OPERATIONS	DISP . LINEHANDLERS LOG		0	2
OPERATIONS	DISP . LOCAL NOTICE TO MARINER		0	1
OPERATIONS	DISP . MOVE TO ARCHIVES REPORT (FICHE)		0	15
OPERATIONS	DISP . NIGHT LOG		0	15
OPERATIONS	DISP . NIGHT ORDERS		0	1
OPERATIONS	DISP . OPERATING DAY LOGS		0	15
OPERATIONS	DISP . POSITION REPORTS (NIGHT LOG COPY)		0	5
OPERATIONS	DISP . RADIO LICENSES		0	1
OPERATIONS	DISP . SERVICE ORDERS (CSR)		0	15
OPERATIONS	DISP . SINGLE SIDEBAND LOG-RADIO STATION		0	3
OPERATIONS	DISP . UTILIZATION REPORT (VESSEL BY DAY)		0	6
OPERATIONS	DISP . VESSEL HOUR SUMMARY REPORT		0	5
OPERATIONS	DISP . VESSEL LOGS		0	15
OPERATIONS	DISP . VOYAGE LOGS (CSR)		0	6
OPERATIONS	HIST . HISTORICAL RECORDS		0	50
OPERATIONS	HIST . PHOTOGRAPHS		0	50
OPERATIONS	LOG . CUSTOMER FILE/PROJECT (CSR)		0	3
OPERATIONS	OIL . BILLS OF LADING (CSR)		0	6
OPERATIONS	OIL . DISPATCH SCHEDULES (CSR)		0	15
OPERATIONS	OIL . TANKERMAN LOG SHEETS (CSR)		0	15
OPERATIONS	OVP . ACQUISITION		0	15
OPERATIONS	OVP . BUDGET ACCOMPLISHMENT CRITICAL ISSUES		0	1
OPERATIONS	OVP . BUILDING RECORDS-VESSELS		0	6
OPERATIONS	OVP . CONTINGENCY PLANS		0	1
OPERATIONS	OVP . CONTRACT, TOWAGE		0	6
OPERATIONS	OVP . DECK OFFICERS' MEETING		0	2
OPERATIONS	OVP . DIVESTMENT		0	6
OPERATIONS	OVP . ENHANCED TRACTOR TUG MATERIAL		0	15
OPERATIONS	OVP . LABOR NEGOTIATIONS		0	6
OPERATIONS	OVP . MAINTENANCE & REPAIR RECORDS		0	15
OPERATIONS	OVP . OIL SPILL RECORDS		0	10
OPERATIONS	OVP . PROJECTS		0	1
OPERATIONS	OVP . PUBLIC HEARINGS/PROPOSED RULE MEETING		0	1
OPERATIONS	OVP . SECURITY POLICY & PROCEDURES		0	10
OPERATIONS	OVP . SPECIAL SUBJECT MATTER		0	2
OPERATIONS	OVP . TASK FORCE RECORDS		0	1
OPERATIONS	OVP . TOWING SAFETY ADVISORY COMMISSION		0	10
OPERATIONS	OVP . TRC BOARD MEETING PLAN PRESENTATION		0	1
OPERATIONS	OVP . UNIT EVALUATION		0	7
OPERATIONS	OVP . VESSEL VALUES		0	6

DEPARTMENT	RECORDS CATEGORY NAME	REVIEW YEARS:	ACTIVE	INACT
OPERATIONS	OVP . VESSELS SOLD		0	6
OPERATIONS	OVP . VISITOR REGISTRATION		0	1
OPERATIONS	OVP . WASH. REGIONAL MARINE SAFETY COMM.		0	3
OPERATIONS	PNW . AD AGENCY SELECTION		0	3
OPERATIONS	PNW . CONTRACT, CHARTER BOATS (COPY)		0	6
OPERATIONS	PNW . CONTRACT, CUSTOMER (COPY)		0	6
OPERATIONS	PNW . CONTRACT, PRIVATE CARRIAGE (COPY)		0	6
OPERATIONS	PNW . CONTRACT, RAILCAR (COPY)		0	6
OPERATIONS	PNW . CONTRACT, TOWAGE (COPY)		0	6
OPERATIONS	PNW . MARKETSHARE (COMPETITOR INFORMATION)		0	3
OPERATIONS	PNW . ORDER FILES		0	3
OPERATIONS	PNW . RATES		0	2
OPERATIONS	PNW . SALES RECORDS-VESSELS, SALES, PROJECTS		0	3
OPERATIONS	PNW . WEEKLY ACTIVITY REPORT		0	1
OPERATIONS	VAD . VESSEL ARCHIVES		0	10
OPERATIONS	VAD . VESSEL FILES (OFFICIAL DOCUMENTS)		0	10
OPERATIONS	VAD . VESSELS SOLD		0	6
PURCHASING	PUR . BILLS OF LADING		0	6
PURCHASING	PUR . CURRENT VESSEL HISTORY		0	1
PURCHASING	PUR . CYCLE COUNT WORKSHEETS, INVENTORY PHYSICAL		0	3
PURCHASING	PUR . PETTY CASH ORDERS		0	6
PURCHASING	PUR . PURCHASE ORDERS		0	6
PURCHASING	PUR . VENDOR VOLUME OF BUSINESS REPORT		0	6
RISK MGMT	RSK . CLAIMS . ACCIDENT CARDS (CAPTAIN & SEAMEN)		0	5
RISK MGMT	RSK . CLAIMS . ACTIVITY SUMMARY REPORTS		0	3
RISK MGMT	RSK . CLAIMS . CASUALTY LOSS REPORTS		0	3
RISK MGMT	RSK . CLAIMS . CLAIMS LISTING		0	1
RISK MGMT	RSK . CLAIMS . GENERAL LIABILITY		0	15
RISK MGMT	RSK . CLAIMS . HULL & MACHINERY		0	6
RISK MGMT	RSK . CLAIMS . INDUSTRIAL INDEMNITY INFORMATION		0	6
RISK MGMT	RSK . CLAIMS . LONGSHORE		0	15
RISK MGMT	RSK . CLAIMS . MASTER CLAIMS LISTING		0	3
RISK MGMT	RSK . CLAIMS . NON-MARINE, MISC.		0	15
RISK MGMT	RSK . CLAIMS . POLLUTION LIABILITY		0	15
RISK MGMT	RSK . CLAIMS . PROTECTION & INDEMNITY-SEAMEN		0	15
RISK MGMT	RSK . CLAIMS . TOWERS LIABILITY		0	15
RISK MGMT	RSK . CLAIMS . VESSEL CASUALTIES REPORTS		0	6
RISK MGMT	RSK . EC . ENVIRONMENTAL COMPLIANCE DOCUMENTS		0	15
RISK MGMT	RSK . EC . EXPOSURE FIGURES		0	15
RISK MGMT	RSK . EC . HAZARD EXPOSURE RECORDS RISK/SAFETY		0	30
RISK MGMT	RSK . GEN . ACCOUNTING RESERVE REPORT		0	1
RISK MGMT	RSK . GEN . PAYMENT REGISTERS		0	10
RISK MGMT	RSK . GEN . RISK MANAGEMENT DEPARTMENT DESCRIPTIONS		0	6
RISK MGMT	RSK . GEN . WAR RISK RECORDS		0	15
RISK MGMT	RSK . INS . CERTIFICATES OF COMPLIANCE		0	1
RISK MGMT	RSK . INS . CERTIFICATES OF INSURANCE		0	15
RISK MGMT	RSK . INS . LIABILITY RECORDS		0	6
RISK MGMT	RSK . INS . OSHA #200 (RECORDING OF ACCIDENT)		0	15
RISK MGMT	RSK . INS . POLICIES		0	15
RISK MGMT	RSK . INS . RECERTIFICATION		0	6
RISK MGMT	RSK . SAFETY . HEALTH & SAFETY BULLETINS		0	1
RISK MGMT	RSK . SAFETY . SAFETY INSPECTIONS (OPERATIONS/VESSEL ADMINISTRATION)		0	5

DEPARTMENT	RECORDS CATEGORY NAME	REVIEW YEARS:	ACTIVE	INACT
RISK MGMT	RSK . SAFETY . SAFETY RESOURCES		0	5
SALES	OCE . ASSET REDEPLOYMENT		0	1
SALES	OCE . CONTRACTS, LONG TERM		0	6
SALES	OCE . CONTRACTS, SPECULATIVE		0	6
SALES	OCE . SPECIAL PROJECTS		0	3
SHIPYARD	SHP . BLUEPRINTS		0	15
SHIPYARD	SHP . CAPITAL EXPENDITURES (CSR)		0	15
SHIPYARD	SHP . COMMERCIAL FILES-MAINTENANCE & REPAIR		0	15
SHIPYARD	SHP . ENGINE ROOM LOGS (CSR)		0	15
SHIPYARD	SHP . ENGINEERING FILES-ENGINEERING		0	3
SHIPYARD	SHP . ENGINEERING FILES-MACHINERY		0	15
SHIPYARD	SHP . FOSS FILES-CAPITAL APPROPRIATIONS		0	15
SHIPYARD	SHP . FOSS FILES-CASUALTY		0	15
SHIPYARD	SHP . FOSS FILES-MAINTENANCE & REPAIR		0	15
SHIPYARD	SHP . MANPOWER REPORT		0	10
SHIPYARD	SHP . OIL SAMPLINGS (CSR)		0	4
SHIPYARD	SHP . U.S. DEPT. OF TRANSPORTATION-LOAD NOTICE		0	1
TERMINAL	TRM . CONTRACTS (COPY)		0	6
TERMINAL	TRM . CUSTODIAL AGREEMENTS		0	6
TERMINAL	TRM . CUSTODIAL VESSEL FILES (VESSEL BOARDING PERMITS)		0	6
TERMINAL	TRM . JOB CUSTOMER'S FILES		0	6
TERMINAL	TRM . MOORAGE CUSTOMER FILES		0	4
TERMINAL	TRM . STORAGE CUSTOMER FILES		0	3
TERMINAL	TRM . TERMINAL MONTHLY REV/COST FILES		0	6

RECORD DESTRUCTION LIST

November 2, 1976⁷⁷

	WIND RIVER - RAFT Reports	4 years
14a	Contracts	5 year after expiring
15b	Tax records-Property	6 years
7b	Trial Balances	4 years 76
18a	Insurance records Parts	5 → years
19a	Bank Statements	3 years
19b	Cash Receipts	3 years except cash book 77+L
21	Audit reports	3 years
30a	Settlements with Agents &RR's	6 years
40a	Labor Distribution	4 years
44a	Invoice Register	15 years
43b	Cancelled checks-Vouchers	10 years
43c	Vouchers payable #Support	6 years 74 and L
44a	Accounts Receivable Register	15 years
44b	Invoices	4 years 76 and L
44c	Charter agreements	2 years after expiring
50b	Insurance claims	6 years
60a	Tariffs	2 years after expiration
71a	P.O.'s, acknowledgements	3 years
71b	Inventory records	3 years
82	Operating reports-US Engrs.	3 years
83a	Boat Logs ✓	6 years 74+L
83e	Accident reports	3 years
100a	ICC Reports	6 years
101	Annual reports to Stockholders	Permanent
113	Employee records-Applications, etc.	1 year
41a	Payroll Summaries	6 years
41b	Payroll deductions	Optional
42b	Work Orders, Diesel Slips	2 years
41d	Cancelled Payroll Checks	Optional 10 yrs
45a	Deeds & Titles	Permanent
45d	Depreciation Schedules	Permanent
91a	Orders	2 years 78+L
18c	Insurance Policies	Optional
43d	Check Book Stubs	3 years
	CASH RECEIPTS RECORDS	2 YEARS
	TIME SHEETS	7 "

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Old Bob Hindman We are not under ICC Regulations

RECORD RETENTION REQUIREMENTS

The period of retention for each record is affected by requirements of tax laws and other regulatory legislation and by the usefulness of the record. The suggested number of years that the various business records should be kept are listed below:

2 to 3 Years

Acknowledgements

Delivery receipts

3 to 4 Years

Deposit slips

Requisitions

Purchase inquiries

4 to 5 Years

Bank statements

Freight drafts

Bills of lading

Insurance policies

Correspondence with applicants

(after expiration)

Labor contracts

Employees' application (after termination)

(after expiration)

Manifests

Express receipts

Receiving reports

Freight bills

Sales invoices

Freight claims

Shipping tickets

(after expiration)

Time cards

5 to 6 Years

Correspondence, general

Inventories

Correspondence, purchase

Orders, original incoming

Credit memos

War contracts and all

Employees' daily time reports

papers pertaining thereto

Employee withholding exemption

certificates (after termination)

6 to 7 Years

Correspondence, war bond

Payroll

Credit files

Price and policy bulletins

Expense reports

(superceded)

Inventory recaps

7 to 8 Years

Checks, payroll

Sales sheets

Employees' earnings record

Specification sheets

Invoice, vendors

Purchase orders

8 to 9 Years

Accident reports (after settlement)

Checks, general

Agreements, leases

Compensation cases

(after expiration)

(after closing)

Vouchers

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10 Years

Agreements, contracts (after expiration)
Insurance claims (after settlement)

17 Years

Agreements, licenses

Permanent

Agreements, deeds
Ledgers and journals, cash
Numerical copy of voucher
checks
Ledgers and journals,
customer
Ledgers and journals,
general
Annual reports
Plant surveys
Time study reports

Audit reports
Stock certificates
Taxes, State and Federal
Payroll journals
Plant ledgers
Minutes, Stockholders
and Directors
Property papers (including
depreciation schedules)
Patents

Administrative practice with respect to destruction of
records should include-

1. Written authorization by the officer empowered to supervise
with destruction (under a list of records to be destroyed).
2. Signed statement by person designated to actually destroy
records to the effect that such records have been des-
troyed. This should be used as a permanent record of
what has been destroyed and furnishes authority for
such acts.

We feel that the foregoing time schedule for the destruction
of records should be further reviewed by management to determine if
the detailed operations of the business would necessitate any change
in the retention of records.

it subject to the carrier's control, then the record shall include a statement of the relevant circumstances.

1227.6 Carriers going out of business.

The records and documents relating to operations of a carrier subject to the regulations in this part may be destroyed without regard to the prescribed periods of retention after carrier status is abandoned for purposes of the Interstate Commerce Act: *Provided however*, (a) if the carrier is a corporation being dissolved by act of the authority which created it, the records may not be destroyed until dissolution is otherwise complete, and (b) if the carrier is not

incorporated or is being kept alive for purposes other than carrier operations, records relating to former carrier operations may not be destroyed until all transactions relating to such operations are completed.

§ 1227.7 Prescribed periods of retention.

The following list describes the purpose for which a record is necessary and the prescribed periods shall be observed even if a record by some other name serves the described purpose. If identical copies of the same document serve more than one such described purpose, only one copy is required to be retained by the regulations of this part.

Item	Description of records, etc.	Period to be retained
GENERAL AND FINANCIAL		
1	Minute books of directors', executive committee's, stockholders', and other meetings.	Permanent.
2	Code and cipher books, file copies of.	Permanent.
3	Capital stock records:	
	(a) Capital stock ledger.	Permanent.
	(b) Capital stock certificates, records of stubs of.	Permanent.
	NOTE: If the information shown on the stubs is recorded in permanent records, the stubs are required to be retained only for a period of three years.	
	(c) Stock transfer register.	Permanent.
	(d) Memoranda and bills of sale or of transfer of capital stock.	2 years.
	(e) Capital stock subscription notices and requests for allotment.	1 year.
	(f) Canceled capital stock certificates. (See item 6.)	
4	Long-term debt records:	
	(a) Registers of bonds and certificates.	Permanent.
	(b) Records or stubs of bonds and certificates.	Permanent.
	NOTE: If the information shown on the stubs is recorded in permanent records, the stubs are required to be retained only for a period of three years.	
	(c) Memoranda and bills of sale or of transfer of registered bonds and certificates.	2 years.
	(d) Records of interest coupons paid and unpaid.	3 years after payment.
	(e) Funded debt subscription notices and requests for allotment.	1 year.
	(f) Canceled or unissued bonds, and certificates, and paid interest coupons. (See item 6.)	
5	Corporate elections:	
	(a) Proxies of holders of voting securities.	2 years.
	(b) Lists of holders of voting securities presented at meetings.	6 years.
	(c) Qualification oaths of judges of election.	Optional.
	(d) Qualification oaths of directors.	Optional.
	(e) Ballots cast and tabulations of votes.	2 years.
	(f) Judges' reports of election results.	2 years.
6	Retired stock certificates, bonds, notes, interest coupons, and trustee's certificates, and temporary certificates; taken up and canceled.	Optional.
7	Ledgers:	
	(a) General and auxiliary ledgers and indexes thereto, except as provided for elsewhere in these regulations.	Permanent.
	(b) Trial balance sheets of general and auxiliary ledgers.	4 years.
8	Record of securities owned, in treasury, or with custodians.	Permanent.
9	General and auxiliary journals.	Permanent.
10	General and auxiliary cash books, except cash books at agencies provided for in item 27 (a).	Permanent.
	NOTE: If any receipts or payments are entered in the aggregate in the general cash book and are detailed only on loose sheets, such loose sheets constitute an auxiliary cash book when no other permanent record of the items thereon is made.	
11	(a) General journal entries.	Permanent.
	(b) Supporting papers not otherwise provided for.	6 years.
12	Records summarizing the results of auxiliary (outside) or holding company operations for entry in general books.	6 years.
	NOTE: Ledgers, journals, abstracts, reports, vouchers, tickets, etc., shall be retained for the same periods as are provided for similar documents elsewhere in these regulations.	
13	Corporate identity:	
	(a) Incorporation and other historical records.	Permanent.
	(b) Charters and franchises with supporting details.	Until legally required to release.

Item	Description of records, etc.	Period to be retained
GENERAL AND FINANCIAL—continued		
14	Contracts and agreements:	
	(a) Contracts, leases, and agreements except as provided in item 14(c).	5 years after expiration or cancellation. Do.
	(b) Card or book records of contracts, leases, and agreements made, and expirations and renewals.	In original form for 1 year after expiration or cancellation, provided there is pending litigation involving these records and, provided that the carrier informs the Commission of its intended action 2 weeks prior to date the records are to be destroyed.
	(c) Contracts and required files for transactions which are subject to the provisions of the Clayton Antitrust Act (15 U.S.C. 20).	6 years after expiration or cancellation.
	(d) Card or book records of contracts, leases, and agreements made, and expirations and renewals.	3 years.
15	(a) Tax records, copies of schedules and returns to taxing authorities for tax purposes.	6 years after settlement.
	(b) Records of appeals, tax bills, and statements.	Permanent.
16	Copies of applications to and authorities from regulating bodies for the issuance of stocks, bonds, and other securities.	3 years.
17	Records of expired or canceled fidelity and indemnity bonds, including the bonds.	3 years.
18	Insurance records:	
	(a) Records pertaining to the payment of insurance premiums and to insurance recoveries.	3 years.
	(b) Inspectors' reports of conditions of insured property.	2 years.
	(c) Insurance policies.	Optional.
	(d) Schedules of risks covered by self insurance.	3 years.
	Treasurer's records:	
	(a) Statements from depositaries of funds received, disbursed, and transferred.	3 years.
	(b) Daily or other periodical statements of the receipt and disbursement of funds. (See note under item 10.)	3 years.
	(c) Ledgers, journals, and other records of outstanding vouchers, checks, drafts, etc., issued and not presented.	3 years.
	(d) Bank deposit books, and stubs, ledgers, or records of checks.	Optional.
	(e) Copies of deposit slips.	Optional.
	Miscellaneous records pertaining to agents' accounts:	
	(a) General office records or ledgers of agents' accounts showing debits and credits from various sources.	6 years.
	(b) General office records relating to extension of credit for transportation and other charges.	2 years after discontinuance of credit arrangement.
	(c) Statements of corrections in agents' accounts.	3 years.
	Reports of examinations, audits, and transfers by special accountants, traveling auditors, time inspectors, weight inspectors, etc., and supporting papers.	3 years.
	Records pertaining to verification of treasurer's cash or securities.	2 years.
REVENUES		
	Freight revenue records:	
	(a) Details of settlements with agents and others, and with carriers.	6 years.
	(b) Record of unsettled freight bills, freight bills in suspense, etc.	1 year after disposition.
	(c) Tracers and supporting papers concerning unsettled freight bills.	Until settled.
31	Passenger revenue records:	
	(a) Details of settlements with agents and others, and with other carriers.	6 years.
	(b) Records and reports of passenger associations and bureaus.	3 years.
32	Line service revenue records, other than freight and passenger revenues, detailing settlements with agents and others, and with other carriers.	3 years.
33	Records of revenues from operations other than line service, detailing settlements with agents and others, and with other carriers.	3 years.
34	Cash fare collection journals, ledgers, and records.	2 years.
EXPENDITURES		
40	Labor distributions and summaries:	
	(a) Records showing the detailed distribution of labor expenditures charged to all accounts, including memoranda and memorandum recapitulation sheets, except as otherwise provided in item 45.	4 years.
	(b) Work orders, job tickets, and other papers covering the application of labor, the details of which have been transcribed into other records for retention.	2 years.
41	Payroll records:	
	(a) Payrolls and summaries.	6 years.
	(b) Records and memoranda pertaining to deductions from payrolls.	Optional.
	(c) Receipted pay checks, certificates issued for wages, discharge tickets, time tickets, and other evidences of payments for services rendered by employees, except as otherwise provided in item 45.	3 years.
	(d) Canceled pay checks drawn in favor of "bearer" in payment of wages for which receipt is shown on payrolls or other records retained by carrier.	Optional.

Item	Description of records, etc.	Period to be retained
EXPENDITURES—continued		
42	Material distributions and summaries: (a) Journals, ledgers, or other records and memoranda showing the detailed distribution of expenditures for materials and supplies chargeable to all accounts, including memorandum recapitulation sheets. (b) Work orders, job tickets, and other papers covering the application of labor and of materials and supplies, the details of which have been transcribed into other records for retention.	4 years. 2 years.
43	Vouchers: (a) Register of audited vouchers payable and indexes thereto. (b) Paid drafts, paid checks, and receipts for cash paid out, except as otherwise provided in item 50c. (c) All vouchers or accounts payable and supporting papers. (See item 45). (d) Stubs of bank check books. (e) Lists containing authorities for payments of specific vouchers. (f) Reports of drafts issued by claim agents, terminal and station agents, and others. (g) Record or index of vouchers to be made, with notations of dates of issue.	15 years. 10 years. 6 years. 3 years. 2 years. 1 year. Optional.
44	Bills collectible: (a) Register of bills collectible (or accounts receivable bills) and indexes thereto. (b) Copies of bills issued for collection, and supporting papers which do not accompany the original bills. (c) Copies of detailed receipts for rental of vessels to others under charter, contract, or oral agreement. (d) Periodical statements of unsettled accounts, except trial balance sheets. (e) Record or index of bills to be issued, with notations of dates of issue.	15 years. 4 years. 2 years after expiration of agreement. Optional. Optional.
45	Real property and equipment records: (a) Deeds and other title papers. (b) Records and memoranda of the cost or the inventory value of real property and equipment. (c) Records and memoranda showing in detail all the items pertaining to expenditures for real property and equipment. (d) Records and memoranda pertaining to depreciation, retirements, and replacements of equipment and other property; also historical records of equipment and other property. (e) Receipted pay checks, certificates issued for wages, time tickets, and other evidences of payment for services rendered by employees in connection with real property and equipment. If full information concerning the expenditures and the distribution of the charge is shown on payrolls or other records retained according to item 46c.	Permanent. Permanent. Permanent but only 3 years if transferred to permanent records. Permanent. 2 years.
46	Special authorities for expenditures: (a) Estimates and special authorities for expenditures for maintenance and improvements. (b) Detail records and memoranda pertaining to such estimates, if summarized in records covered by item 46a.	Optional if expenditures are detailed in permanent records. Optional.
CLAIMS		
50	Claim records: (a) Claim registers, card or book indexes, and other records in connection with overcharge, loss and damage, personal injury, fire, and other claims. (b) Records showing the details of authorities issued to agents, carriers, and others for participation in freight claims. (c) All papers substantiating overcharge, loss and damage, personal injury, fire, and other claims, whether such papers are filed separately or attached to vouchers. (See item 43b.) (d) Claim jackets if all information thereon appears in records covered by item 50c.	6 years. 6 years. 3 years after settlement or rejection. Optional.
51	Claim investigation records: (a) Reports and statements regarding personal injuries, when not necessary to support claims or vouchers. (b) Tracers, reports, and other records pertaining to unclaimed, over, short, damaged, and refused freight, when not necessary to support claims or vouchers.	3 years. 1 year.
52	Sales orders incident to disposal of damaged, refused, and unclaimed freight.	3 years.
TRAFFIC		
60	Tariffs and other rate authorities: (a) Tariffs, classifications, division sheets, and related circulars affecting the transportation of persons or property, in the general files of the traffic or other department in which the complete official file is maintained. (b) Tariffs, classifications, division sheets, and related circulars in other departments and at agencies, if copies of the same issues of such tariffs, etc., are preserved in the general files referred to in item 60a. (c) Special or reduced rate orders, and supporting papers, covering the movement of passengers. (d) Requests and receipts from agents and others for tariffs, classifications, division sheets, and related circulars. (e) Copies of concurrences and powers of attorney filed with the Interstate Commerce Commission and with other regulating bodies.	2 years after expiration or cancellation. Optional after expiration or cancellation. 2 years after expiration or cancellation. Optional. 2 years after cancellation.

Item	Description of records, etc.	Period to be retained
TRAFFIC—continued		
60	Tariffs and other rate authorities—Continued (f) Written requests on carrier from persons and companies for quotations of rates and copies of carrier's quotations. (g) Authorities for the transportation of property, free or at reduced rates, and supporting papers. (h) Correspondence and working papers in connection with the making of rates and compilation of tariffs, classifications, division sheets, and related circulars affecting the transportation of persons or property.	Optional. 3 years. 3 years after cancellation of tariff, etc.
61	Diversions of freight: (a) Records pertaining to the diversion or reconsignment of freight. (b) Requests, tracers, and correspondence in connection with diversions or reconsignments.	3 years. 2 years.
62	Ticket records: (a) Copies of orders on printing houses for ticket stock. (b) Record of ticket stock received, issued, and destroyed. (c) Requisitions and receipts for tickets and cash fare receipts furnished agents, pursers, and stewards. (d) Used or canceled passenger-fare tickets, chair tickets, stateroom tickets, meal tickets or checks, prepaid orders, exchange checks, and storage checks; the reports of which, showing their sale or issue, have been audited. (See item 80f.) (e) Unissued or unused tickets if a complete record is kept in accordance with item 62b. (f) Inventories of tickets in hands of agents. (g) Records and reports of tickets redeemed.	2 years. 2 years. 2 years. Optional. Optional. 2 years. 2 years.
PURCHASES AND STORES		
70	Bids, offers, copies of orders and correspondence pertaining to the purchase or sale of material and supplies.	3 years.
71	Material and supplies: GENERAL FUEL LOGS + TICKETS (a) Records of material and supplies on hand and detail papers of inventories. (b) Records and reports of material and supplies received and issued. (c) Requisitions and receipts for material and supplies issued, the totals of which have been transcribed into other records for retention.	3 years. 3 years. 1 year.
TRANSPORTATION		
80	Passes and free tickets: (a) Copies of orders on printing houses for pass stock. (b) Records of pass stock received, distributed, and destroyed. (c) Requests for passes, copies or stubs of requests for passes, and receipts for passes. (d) Records of passes issued. (e) Records of passes received from other carriers. (f) Stubs of trip passes. (g) Pass identification slips. (h) Records of annual or term passes honored. (i) Trip passes and free passenger-fare tickets collected. (j) Void, unused, and unissued passes. (k) Records of free passenger-fare tickets issued. (l) Pursers' and stewards' reports of passes collected or honored. (m) Reports of trip passes issued.	1 year. 1 year. 3 years. 3 years. 3 years. 3 years. 1 year. 1 year. 1 year. 1 year. 3 years. 1 year. 2 years.
81	Pursers' and stewards' reports: (a) Reports of cash collections if transcribed to records covered by item 34. (b) Reports of cash collections if not transcribed to records covered by item 34. (c) Reports of tickets collected or honored and of passengers carried. (d) Reports of passes collected or honored. (See item 80.) (e) Reports of baggage handled. (f) Reports of freight and other traffic handled. (g) Balance sheets and supporting papers.	Optional. 2 years. 2 years. 2 years. 2 years. 2 years. 3 years.
82	Operating department records pertaining to the movement of ships, lighters, and barges.	3 years.
83	Ship records: (a) Ship's log. (b) Ship's articles. (c) Passenger and room list. (d) Correspondence in connection with reservations. (e) Accident reports. (f) Pursers' and stewards' berth and chair checks.	6 years. 6 years. 6 years. 1 year. 3 years. Optional.
AGENCIES		
90	Freight records: (a) Reports of freight forwarded and received. (b) Transfer records of freight received from and delivered to connecting carriers.	3 years. 3 years.
91	Freight waybills and freight bills: (a) Original local waybills and freight bills, and audited copies thereof. (b) Original interline waybills and freight bills received from other carriers. (c) Copies of all interline waybills and freight bills made to other carriers. (d) Copies of interline waybills moving between points on other lines to which the carrier is intermediate.	3 years. 2 years. 2 years. 2 years.

Item	Description of records, etc.	Period to be retained
AGENCIES—continued		
91	Freight waybills and freight bills—Continued (a) Reports of undercharges and overcharges (correction notices)..... (f) Company freight waybills..... (g) Copies of waybills and freight bills furnished to joint traffic associations, bureaus, and similar agencies, if such copies contain no information other than that appearing on the original waybills and freight bills or in other records. (h) Memoranda on slips on which are listed waybills and freight bills sent to the audit office, if such memoranda or slips are not used in auditing the accounts.	2 years. 2 years. Optional. Optional.
92	Bills of lading and releases: (a) Copies of bills of lading..... (b) Shippers' order-notify bills of lading taken up and canceled..... (c) Contracts covering transportation and storage risks of carriers..... (d) Shipping tickets..... (e) Dray tickets.....	2 years. 2 years. 4 years. 2 years. 2 years.
93	Baggage records: (a) Baggage waybills and manifests..... (b) Records of baggage handled..... (c) Used and canceled baggage checks (not excess baggage)..... (d) Excess baggage checks (including c.o.d.), excess baggage book coupons, and excess baggage permits; the reports of which have been audited. (e) Record of baggage check stock received, issued, or destroyed..... (f) Unused baggage checks, if record is kept in accordance with item 93e..... (g) Receipts from agents, pursers, stewards, baggage masters, and others; for valuable letters and packages.	2 years. 2 years. Optional. Optional. 2 years. Optional. Optional.
94	Agents' reports: (a) Reports of ticket sales..... (b) Baggage reports..... (c) Reports of miscellaneous collections.....	2 years. 2 years. 2 years.
95	Remittances: Agents', pursers', and stewards' remittance slips, bank deposit slips, and supporting papers, not provided for elsewhere.	2 years.
96	Agents' balance sheets and supporting papers.	3 years.
97	Other records at stations, wharf offices, pursers' and stewards' offices, and other agencies: (a) Cash books..... (b) All others.....	6 years. 3 years.
98	Instructions to agents and others: (a) Books and circulars of instructions to agents and others in the general file of the department in which the complete official file is maintained. (b) Surplus copies of books and circulars of instructions and copies in other departments and at agencies, if copies of the same issues are preserved in the general file referred to in item 98a.	3 years after expiration or cancellation. Optional.
99	Duplicate copies of reports, records, and documents retained in agency files, the retention of which is not provided for elsewhere.	Optional.
STATISTICS		
100	Reports to Interstate Commerce Commission and other regulating bodies: (a) Annual financial, operating, and statistical reports, file copies of, and supporting records and papers. NOTE: If the figures for the above-mentioned reports are assembled on memorandum sheets, such sheets constitute a part of the supporting papers and should be retained accordingly. (b) Periodical reports of operating revenues, expenses, and income, file copies of, and supporting records and papers. (c) Accident reports, file copies of, and supporting records and papers.....	6 years. 3 years. 3 years. Permanent.
101	Annual reports or statements to stockholders, file copies of.....	3 years.
102	Statistical statements, statistical records, and supporting papers showing tonnage, revenue, and expenses not covered by item 100.	Optional.
103	Reports of tonnage, revenue, and receipts used only for preparing statements of estimated revenues or expenses or the movement of traffic.	1 year.
104	Tabulating cards used in the compilation of statistics and other data, when the results are transcribed to other records covered by these regulations.	3 years.
111	Audit reports of public accountants.	Optional.
112	Duplicate copies of records and documents listed in these regulations, if all information on such duplicates is contained on the originals or other copies retained.	1 year.
113	Records of employees, including applications for employment, reports and certificates of examinations, service records, efficiency tests, employees' rosters, and other similar records.	1 year.
114	Provident department records, such as employees' relief, hospital, insurance, and savings departments, other than records pertaining to the receipt and disbursement of funds. NOTE: The records pertaining to the receipt and disbursement of funds must be retained for the same periods as are provided for similar records in item 10b.	Permanent.
115	Data relating to records destroyed.....	For the period prescribed for the record to which the correspondence relates.
116	Correspondence and records thereof relating to the subjects listed in these regulations, not otherwise provided for.	

- END -

memoranda, documents, papers, or correspondence, and the circumstances under which they were lost or destroyed.

Subpart C—Brokers

§ 1226.30 Brokers.

The requirements of §§ 1226.20 to 1226.22 inclusive, shall apply equally to brokers when the subject matter permits application.

PART 1227—WATER CARRIERS

Sec.

- 1227.0 Regulations prescribed.
- 1227.1 Introduction.
- 1227.2 Authority to destroy records.
- 1227.3 Photographic copies.
- 1227.4 Supervision of destruction.
- 1227.5 Record of destroyed records.
- 1227.6 Carriers going out of business.
- 1227.7 Prescribed periods of retention.

AUTHORITY: The provisions of this Part 1227 issued under secs. 304, 318, 317, 54 Stat. 933, 944, as amended; 49 U.S.C. 304, 318, 317.

SOURCE: The provisions of this Part 1227 appear at 82 F.R. 20446, Dec. 20, 1967, unless otherwise noted.

SPECIAL NOTE: Sections 317 and 318 of the Interstate Commerce Act, as amended, include the following provisions:

Sec. 317(d) Any water carrier or other person, or any officer, agent, employee, or representative thereof, who shall willfully fail or refuse . . . to keep accounts, records, and memoranda in the form and manner prescribed by the Commission, or shall willfully falsify, destroy, mutilate, or alter any report, account, record, memorandum, book, correspondence, or other document, required under this part to be kept, . . . shall be deemed guilty of a misdemeanor, and upon conviction thereof in any court of the United States of competent jurisdiction within the district in which such offense was in whole or in part committed, be subject for each offense to a fine of not more than \$5,000. As used in this subsection, the word "keep" shall be construed to mean made, prepared, or compiled, as well as retained.

Sec. 318(g) The Commission may issue orders specifying such operating, accounting, or financial papers, records, books, blanks, tickets, stubs, correspondence, or documents of water carriers or lessors as may, after a reasonable time, be destroyed, and prescribing the length of time the same shall be preserved.

§ 1227.0 Regulations prescribed.

Effective June 1, 1957, all carriers by water, including lessors, thereof, shall comply with the regulations in this part before destroying any operating, ac-

counting, or financial papers, records, books, blanks, tickets, stubs, correspondence, or documents.

§ 1227.1 Introduction.

The regulations in this part specify the records and documents which may be destroyed and prescribe the length of time the same shall be preserved, but mention of a record or document hereinafter imposes no requirement that it shall be installed if its purpose is otherwise being adequately served. Compliance with the regulations in this part will not exempt a carrier from statutory requirements, other than provisions of the Interstate Commerce Act, for retention of records or documents for periods longer than those prescribed in this part.

§ 1227.2 Authority to destroy records.

(a) **General authority.** Carriers by water may destroy records or documents named or described in the regulations in this part after they have been preserved for the prescribed periods of time. Permanent records are those which may not be destroyed without special authority.

(b) **Special authority.** A carrier proposing to destroy records or documents which are not named or described in the regulations in this part, or which if named or described have not been retained for the period required by the regulations in this part, may request special authority to destroy them. Applications for such special authority shall describe in detail the records or documents to be destroyed and shall explain why their continued retention is unnecessary.

§ 1227.3 Photographic copies.

(a) Certain records and documents may be preserved on microfilm and the film retained in lieu of the original record or document, subject to the following limitations:

(1) The records listed in § 1227.7 with a permanent retention period may not be destroyed after being photographed for preservation unless special authority is first secured as provided in § 1227.2(b).

(2) Records and documents listed in the following items of § 1227.7 shall be retained in their original form throughout the entire period of retention prescribed for them respectively, unless special au-

thority to destroy them is first secured as provided in § 1227.2(b):

Item	Description
5-----	Corporate elections.
8-----	Record of securities owned, in treasury, or with custodians.
15-----	Tax records.
41(a)-----	Payrolls and summaries.
43(a)-----	Register of audited vouchers payable and indexes thereto.
43(b)-----	Paid drafts, paid checks, and receipts for cash paid out.
43(c)-----	Vouchers or accounts payable and supporting papers.
44(a)-----	Register of bills collectible and indexes thereto.
118-----	Correspondence which pertains to records or documents required by this subsection to be retained in original form.

(3) The records and documents listed in this subparagraph, which are required under the regulations in this part to be retained two years or more, shall be retained in their original form at least two years, even after they have been photographed for preservation:

Item	Description
12-----	Records summarizing the results of auxiliary or holding company operations for entry in general books.
20-----	Miscellaneous records pertaining to agents' accounts.
30-----	Freight revenue records.
31-----	Passenger revenue records.
32-----	Line service revenue records, other than freight and passenger revenues, detailing settlements with agents and others, and with other carriers.
33-----	Records of revenues from operations other than line service, detailing settlements with agents and others, and with other carriers.
50-----	Claim records.
51-----	Diversions of freight.
53-----	Ship's records (for Ship's logs, see § 1227.3(a)(1)).
90 to 99----	Agencies.
118-----	Correspondence which pertains to records or documents required by this subsection to be retained two years in original form.

(b) To be acceptable in lieu of original records, photographic copies must meet the following minimum requirements:

(1) Photographic copies shall be no less readily accessible than the original

record or document as normally filed or preserved would be, and suitable means or facilities shall be available to locate, identify, read, or reproduce such photographic copies. Photographic copies shall be preserved until the end of the period prescribed for the original records or documents.

(2) Any significant characteristic, feature, or other attribute of the original record or document, which photography in black and white will not preserve, shall be clearly indicated before the photograph is made.

(3) The reverse side of printed forms need not be copied if nothing has been added to the printed matter common to all such forms, but an identified specimen of such form shall be on the film for reference.

(4) Film used for photographing copies shall be of permanent record type meeting in all respects the minimum specifications of the National Bureau of Standards, and all processes recommended by the manufacturer shall be observed to protect it from deterioration or accidental destruction.

§ 1227.4 Supervision of destruction.

Within six months after the effective date of the regulations in this part, or within six months after becoming subject to this provision, each carrier shall appoint an officer or other responsible employee to supervise the destruction of records and documents. Such appointment shall be by formal corporate act or, if the carrier is not incorporated, by such formal act as would be necessary to execute a contract binding on the carrier.

§ 1227.5 Record of destroyed records.

The supervising officer or other designated employee shall maintain a record of all carrier records and documents which have been destroyed pursuant to the regulations of this part, except those the retention of which is optional with the carrier. The record shall be available for inspection in the office of the supervising officer and shall be in such detail that the destroyed records or documents may be identified and the time, place, and method of destruction can be established. If the destruction is by accident or at the hand of someone

DEPARTMENT	RECORDS CATEGORY NAME	REVIEW YEARS:	ACTIVE	INACT
ACCOUNTING	ACT . AP . 1099 SUMMARY / ANNUAL		0	6
ACCOUNTING	ACT . AP . ACCOUNT RECONCILIATION		0	6
ACCOUNTING	ACT . AP . BATCH BALANCE REPORT		0	1
ACCOUNTING	ACT . AP . CASH DISBURSEMENTS REGISTER		0	10
ACCOUNTING	ACT . AP . CASH REQUIREMENTS REPORT		0	1
ACCOUNTING	ACT . AP . CHECK COPIES		0	1
ACCOUNTING	ACT . AP . CHECK REGISTER		0	10
ACCOUNTING	ACT . AP . CONTROL TOTALS REPORT		0	1
ACCOUNTING	ACT . AP . CREDIT SLIPS		0	5
ACCOUNTING	ACT . AP . DAILY, WEEKLY REPORT		0	1
ACCOUNTING	ACT . AP . DISBURSEMENT REPORT		0	1
ACCOUNTING	ACT . AP . G/L INTERFACE REPORT		0	1
ACCOUNTING	ACT . AP . INVOICES		0	6
ACCOUNTING	ACT . AP . MASTER FILE CONTROL REPORT		0	1
ACCOUNTING	ACT . AP . MONTHLY REPORT		0	6
ACCOUNTING	ACT . AP . PURCHASE JOURNAL DISTRIBUTION REPORT		0	10
ACCOUNTING	ACT . AP . TRAVEL & ENTERTAINMENT REPORT		0	3
ACCOUNTING	ACT . AP . USE TAX ACCRUAL REPORT		0	6
ACCOUNTING	ACT . AP . VENDOR TRIAL BALANCE REPORT		0	10
ACCOUNTING	ACT . AR . AGING		0	6
ACCOUNTING	ACT . AR . BATCH HEADERS (CSR)		0	6
ACCOUNTING	ACT . AR . CASH RECEIPTS		0	6
ACCOUNTING	ACT . AR . COLLECTION RECORDS		0	6
ACCOUNTING	ACT . AR . DEBIT/CREDIT MEMO REPORT		0	6
ACCOUNTING	ACT . AR . DETAIL LEDGER		0	10
ACCOUNTING	ACT . AR . INTERCOMPANY BILLING		0	6
ACCOUNTING	ACT . AR . SALES INVOICES		0	6
ACCOUNTING	ACT . AR . SALES REGISTER REPORTS		0	10
ACCOUNTING	ACT . AUD . WORKPAPERS		0	6
ACCOUNTING	ACT . AUD . WORKPAPERS (CSR)		0	10
ACCOUNTING	ACT . BANK . CASH DEPOSITS/LOCK BOX		0	6
ACCOUNTING	ACT . BANK . CHECK REGISTERS		0	10
ACCOUNTING	ACT . BANK . CHECKS CANCELED		0	6
ACCOUNTING	ACT . BANK . DEPOSIT SLIPS		0	6
ACCOUNTING	ACT . BANK . PETTY CASH CHECKS (COD'S)		0	6
ACCOUNTING	ACT . BANK . RECONCILIATIONS		0	6
ACCOUNTING	ACT . BANK . STATEMENTS		0	6
ACCOUNTING	ACT . FA . CAPITAL CONSTRUCTION FUND (CCF)		0	15
ACCOUNTING	ACT . FA . CAR DETAIL		0	15
ACCOUNTING	ACT . FA . CAR REPORT		0	10
ACCOUNTING	ACT . FA . FIXED ASSETS REPORT		0	20
ACCOUNTING	ACT . GEN . INSURANCE WORKSHEETS		0	3
ACCOUNTING	ACT . GEN . PREPAID INSURANCE		0	6
ACCOUNTING	ACT . GEN . VESSEL REPORTS		0	10
ACCOUNTING	ACT . GL . 13 MONTH REPORT		0	15
ACCOUNTING	ACT . GL . CHART OF ACCOUNTS AND P.C.		0	10
ACCOUNTING	ACT . GL . FINANCIAL REPORTS (AMRS & B&O)		0	15
ACCOUNTING	ACT . GL . G & A ALLOCATIONS		0	10
ACCOUNTING	ACT . GL . JOURNAL VOUCHERS		0	10
ACCOUNTING	ACT . GL . MONTHLY REPORT		0	10
ACCOUNTING	ACT . GL . RECONCILIATIONS		0	6
ACCOUNTING	ACT . GL . VENDOR TRIAL BALANCES		0	10

ACT. GL. STOCK RECORDS

50

DEPARTMENT	RECORDS CATEGORY NAME	REVIEW YEARS:	ACTIVE	INACT
ACCOUNTING	ACT . INV . COMMISSARY ISSUES		0	3
ACCOUNTING	ACT . INV . MATERIAL CONTROL REPORTS		0	3
ACCOUNTING	ACT . JOB COST . JMS INPUT/EDIT		0	6
ACCOUNTING	ACT . JOB COST . JMS PURGE REPORT (YEAR-END)		0	6
ACCOUNTING	ACT . JOB COST . JMS REPORTS		0	6
ACCOUNTING	ACT . JOB COST . JOB STATUS REPORTS		0	6
ACCOUNTING	ACT . JOB COST . M & R REPORT (YEAR END)		0	6
ACCOUNTING	ACT . JOB COST . RECONCILIATION ACCRUED LIABILITY		0	6
ACCOUNTING	ACT . JOB COST . W.I.P WORKSHEETS (WORK IN PROGRESS)		0	6
ACCOUNTING	ACT . PR . CHECKS		0	6
ACCOUNTING	ACT . PR . DIRECT DEPOSIT TRANSMITTAL REPORT		0	6
ACCOUNTING	ACT . PR . EMPLOYEE MASTER FILE		0	6
ACCOUNTING	ACT . PR . EMPLOYEE PAYROLL CHANGES		0	3
ACCOUNTING	ACT . PR . GARNISHMENT RECORDS		0	6
ACCOUNTING	ACT . PR . HISTORY-YTD		0	6
ACCOUNTING	ACT . PR . JOURNAL VOUCHERS		0	10
ACCOUNTING	ACT . PR . LABOR DISTRIBUTION REPORTS		0	3
ACCOUNTING	ACT . PR . PENSION & WELFARE REPORTS		0	3
ACCOUNTING	ACT . PR . REGISTERS, CHECK		0	10
ACCOUNTING	ACT . PR . REGISTERS, COMBINED		0	10
ACCOUNTING	ACT . PR . TAX REPORTS		0	15
ACCOUNTING	ACT . PR . TIMECARDS		0	3
ACCOUNTING	ACT . PR . TIMESHEETS (CSR)		0	10
ACCOUNTING	ACT . PR . W-2		0	6 15
ACCOUNTING	ACT . PR . W-4		0	15
ACCOUNTING	ACT . PR . WIRE TRANSFERS		0	6
ACCOUNTING	ACT . PR . WORKMAN'S COMPENSATION (CSR)		0	3
ACCOUNTING	ACT . TAX . ALASKA INCOME TAX		0	10
ACCOUNTING	ACT . TAX . BC SOCIAL SERVICE TAX		0	15
ACCOUNTING	ACT . TAX . CALIFORNIA SALES/USE TAX		0	10
ACCOUNTING	ACT . TAX . EXCISE TAX RETURN		0	10
ACCOUNTING	ACT . TAX . LIABILITY ANALYSIS		0	6
ACCOUNTING	ACT . TAX . PACKETS		0	10
ACCOUNTING	ACT . TAX . PORT LOG		0	10
ACCOUNTING	ACT . TAX . PROPERTY TAX		0	10
ACCOUNTING	ACT . TAX . RETURNS		0	15
ACCOUNTING	ACT . TAX . STATE INCOME TAX		0	15
ACCOUNTING	ACT . TAX . THEA FOSS LOGS		0	10
ACCOUNTING	ACT . TAX . TITLE XI RECORDS		0	15
ACCOUNTING	ACT . TAX . TRIAL BALANCE		0	10
ACCOUNTING	ACT . TAX . YEAR-END TAX ACCRUAL		0	10
BILLING	BIL . CAR SLIP INVOICE (CSR)		0	6
BILLING	BIL . RAILCAR DEMURRAGE (CSR)		0	6
BILLING	BIL . RENT-LOG RAFTS (CSR)		0	4
BILLING	BIL . SALES INVOICE COPIES		0	2
BILLING	BIL . TANK BARGE PAPERS BUNKERING		0	4 15
CORPORATE	CORP . ANNUAL REPORTS		0	5
CORPORATE	CORP . MINUTES		0	15
ENVIRONMENTAL	ENV . BILLING & DISPOSAL DOCUMENTATION		0	6
ENVIRONMENTAL	ENV . CONTRACTS		0	6
ENVIRONMENTAL	ENV . HAZWOPER CLASS FILES (HAZARDOUS WASTE TRAINING CERTIFICATES)		0	3
ENVIRONMENTAL	ENV . JOB INVOICES (COPIES)		0	1

DEPARTMENT	RECORDS CATEGORY NAME	REVIEW YEARS:	ACTIVE	INACT
ENVIRONMENTAL	ENV . LOGS, VARIOUS		0	3
ENVIRONMENTAL	ENV . SALES RECORDS (MATERIAL SALES, ETC.)		0	3
ENVIRONMENTAL	ENV . SPILL RECORDS		0	15
ENVIRONMENTAL	ENV . VESSEL EXERCISE & DRILL RECORDS		0	15
ENVIRONMENTAL	ENV . VESSEL LOGS		0	15
FACILITIES	FAC . BUILDING FILES		0	3
FACILITIES	FAC . BUILDING PERMITS		0	3
FACILITIES	FAC . FEDERAL REGISTER		0	1
FACILITIES	FAC . MAINTENANCE REPORT/OFFICE EQUIPMENT		0	3
FACILITIES	FAC . USAGE REPORTS (COPIER/TELEPHONE)		0	1
FACILITIES	FAC . WARRANTIES/OFFICE EQUIPMENT		0	6
FINANCE	FIN . ADMINISTRATIVE FINANCIAL FILES		0	3
FINANCE	<i>Act</i> FIN . AUDIT FILES		0	10
FINANCE	FIN . AUDIT STATEMENT		0	10
FINANCE	FIN . BUDGET PLAN		0	6
FINANCE	FIN . CAPITAL CONSTRUCTION FUND (CCF)		0	15
FINANCE	FIN . MORTGAGE		0	1
FINANCE	FIN . PERFORMANCE REPORTS		0	1
FINANCE	FIN . PLANNING RECORDS		0	1
FINANCE	FIN . PROJECTIONS		0	1
FINANCE	FIN . REPORT MARITIME ADMINISTRATION (REPORT 172)		0	5
FINANCE	FIN . STRATEGIC PLAN		0	5
FINANCE	FIN . T-TAGS COMPLIANCE REPORTING		0	1
HISTORICAL	HIST . HISTORICAL RECORDS		0	50
HISTORICAL	HIST . PHOTOGRAPHS		0	50
H. RESOURCES	HR . BEN . DEATH CLAIMS		0	6
H. RESOURCES	HR . BEN . DISABILITY RECORDS		0	6
H. RESOURCES	HR . BEN . EAP (EMPLOYEE ASSISTANCE PLAN)		0	6
H. RESOURCES	HR . BEN . EEO (EQUAL EMPLOYMENT OPPORTUNITY)		0	6
H. RESOURCES	HR . BEN . INCENTIVE PLANS		0	1
H. RESOURCES	HR . BEN . INDUSTRIAL RELATIONS BENEFITS		0	6
H. RESOURCES	HR . BEN . PAID BENEFITS		0	6
H. RESOURCES	HR . BEN . PENSION/PLAN VESTING		0	6
H. RESOURCES	HR . BEN . PREMIUMS		0	1
H. RESOURCES	HR . BEN . RETIREMENT PLANS		0	6
H. RESOURCES	HR . BEN . SERVICE AWARDS	<i>HR TAX 15 yrs</i>	0	1
H. RESOURCES	HR . BEN . TOP MARINER PLAN		0	1
H. RESOURCES	HR . BEN . WORKMEN'S COMPENSATION		0	6
H. RESOURCES	HR . GEN . AFFIRMATIVE ACTION PLAN		0	6
H. RESOURCES	HR . GEN . EEO - 1,2 PLANS		0	6
H. RESOURCES	HR . GEN . EEO CASES (AFTER TERMINATION)		0	6
H. RESOURCES	HR . GEN . REGULATORY MATTERS-EMPLOYMENT, FAIR PRACTICE CASES		0	6
H. RESOURCES	HR . PA . EMPLOYMENT APPLICATIONS/RESUMES		0	3
H. RESOURCES	HR . PA . EMPLOYMENT ELIGIBILITY VERTICATION (1-9)		0	15
H. RESOURCES	HR . PA . MEDICAL RECORDS-SALARIED		0	30
H. RESOURCES	HR . PA . PERSONNEL ACTION FORMS		0	3
H. RESOURCES	HR . PA . PERSONNEL FILES - SALARIED		0	30
H. RESOURCES	HR . URM . ANTITRUST COMPLIANCE GUIDE		0	1
H. RESOURCES	HR . URM . CONTRACTS/AGREEMENTS		0	6
H. RESOURCES	HR . URM . CONTRIBUTIONS		0	5
H. RESOURCES	HR . URM . CORRESPONDENCE		0	1
H. RESOURCES	HR . URM . DISPUTES, LABOR		0	6

DEPARTMENT	RECORDS CATEGORY NAME	REVIEW YEARS:	ACTIVE	INACT
H. RESOURCES	HR . URM . LABOR NEGOTIATIONS		0	1
H. RESOURCES	HR . URM . MASTERS, MATES & PILOTS ACTIONS		0	6
H. RESOURCES	HR . URM . PREVENTIVE LAW PROGRAM		0	1
H. RESOURCES	HR . URM . RELATED MATTERS		0	6
H. RESOURCES	HR . URM . STRIKE CONTINGENCY PLAN		0	1
H. RESOURCES	HR . URM . WITHHOLDING CERTIFICATIONS		0	1
INFO SVCS	IS . APPLICATION DOCUMENTATION		0	1
INFO SVCS	IS . COMPUTER TAPE BACKUP		0	1
INFO SVCS	IS . DISASTER RECOVERY FORMS		0	1
INFO SVCS	IS . DISASTER RECOVERY PLAN-MAINFRAME		0	1
INFO SVCS	IS . DISASTER RECOVERY PLAN-MICROCOMPUTER		0	1
INFO SVCS	IS . LONG RANGE PLAN		0	1
INFO SVCS	IS . MICROCOMPUTER HW/SW MANUALS/MEDIA		0	2
INFO SVCS	IS . MICROCOMPUTER POLICY & PROCEDURES		0	1
INFO SVCS	IS . PROGRAM BACKUP		0	1
INFO SVCS	IS . PROJECTS/ADMINISTRATION FILES		0	5
INFO SVCS	IS . RECORDS DESTRUCTION FORMS		0	5
INFO SVCS	IS . RECORDS PROGRAM POLICY & PROCEDURES		0	10
INFO SVCS	IS . RECORDS RETENTION SCHEDULES		0	1
INFO SVCS	IS . RECORDS TRANSFER FORMS		0	5
LEGAL	LGL . AFFIDAVITS (CITIZENSHIP) REQUIREMENTS		0	1
LEGAL	LGL . CLOSING DOCUMENTS		0	50
LEGAL	LGL . CONTRACTS		0	6
LEGAL	LGL . CORRESPONDENCE		0	3
LEGAL	LGL . DEEDS		0	50
LEGAL	LGL . FINANCIALS		0	15
LEGAL	LGL . FORCLOSURE DOCUMENTS		0	6
LEGAL	LGL . LEASE ABSTRACTS		0	1
LEGAL	LGL . LISTING OF REAL PROPERTY		0	1
LEGAL	LGL . LITIGATION MATTERS		0	6
LEGAL	LGL . MORTGAGE DOCUMENTS		0	6
LEGAL	LGL . PLOT MAPS		0	15
LEGAL	LGL . PROPERTY APPRAISALS/DESCRIPTIONS		0	50
LEGAL	LGL . PROPERTY INVENTORY		0	6
LEGAL	LGL . SALE OF DESIGN RIGHTS		0	6
LEGAL	LGL . SALE OF REAL ESTATE		0	6
LEGAL	LGL . TITLE, PROPERTY		0	15
LEGAL	LGL . TRADEMARK RECORDS		0	15
LEGAL	LGL . WARRANTS ARREST		0	6
LEGAL	LGL . ZONING PERMITS		0	1
MARINE	MAR . DRUG TESTING RECORDS, NEGATIVE		0	1
MARINE	MAR . DRUG TESTING RECORDS, POSITIVE		0	5
MARINE	MAR . EMPLOYMENT ELIGIBILITY VERIFICATION (1-9)		0	15
MARINE	MAR . LABOR DISTRIBUTION REPORTS		0	2
MARINE	MAR . MEDICAL RECORDS-MARINE		0	30
MARINE	MAR . OCEAN CREW LIST		0	3
MARINE	MAR . PAYROLL REPORTS		0	3
MARINE	MAR . PAYROLL TRANSACTION		0	5
MARINE	MAR . PERSONNEL JACKETS/CASUAL		0	30
MARINE	MAR . PERSONNEL JACKETS/MARINE		0	30
MARINE	MAR . PERSONNEL JACKETS/SHIPYARD		0	30
MARINE	MAR . TIME CARDS		0	3

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DEPARTMENT	RECORDS CATEGORY NAME	REVIEW YEARS:	ACTIVE	INACT
MARINE	MAR . TRAVEL RECORDS/FLIGHT INFORMATION SHEETS		0	1
MARKETING	MKT . LINE OF BUSINESS REPORT		0	5
MARKETING	MKT . LONG RANGE PLANS		0	5
MARKETING	MKT . MARKET SHARE		0	3
MARKETING	MKT . PERFORMANCE REPORTS		0	15
MARKETING	MKT . PRICING FILES		0	3
MARKETING	MKT . PROJECT, FINANCIAL ANALYSIS		0	1
MARKETING	MKT . UNDER ACHIEVING ASSET REPORT		0	1
MARKETING	MKT . VESSEL UTILIZATION		0	15
OPERATIONS	DISP . BARGE REPORTS (SCOW RPTS)		0	5
OPERATIONS	DISP . FUEL REPORTS		0	6
OPERATIONS	DISP . FUEL TICKETS (CSR)		0	3
OPERATIONS	DISP . LINEHANDLERS LOG		0	2
OPERATIONS	DISP . LOCAL NOTICE TO MARINER		0	1
OPERATIONS	DISP . MOVE TO ARCHIVES REPORT (FICHE)		0	15
OPERATIONS	DISP . NIGHT LOG		0	15
OPERATIONS	DISP . NIGHT ORDERS		0	1
OPERATIONS	DISP . OPERATING DAY LOGS		0	15
OPERATIONS	DISP . POSITION REPORTS (NIGHT LOG COPY)		0	5
OPERATIONS	DISP . RADIO LICENSES		0	1
OPERATIONS	DISP . SERVICE ORDERS (CSR)		0	15
OPERATIONS	DISP . SINGLE SIDEBAND LOG-RADIO STATION		0	3
OPERATIONS	DISP . UTILIZATION REPORT (VESSEL BY DAY)		0	6
OPERATIONS	DISP . VESSEL HOUR SUMMARY REPORT		0	5
OPERATIONS	DISP . VESSEL LOGS		0	15
OPERATIONS	DISP . VOYAGE LOGS (CSR)		0	6
OPERATIONS	HIST . HISTORICAL RECORDS		0	50
OPERATIONS	HIST . PHOTOGRAPHS		0	50
OPERATIONS	LOG . CUSTOMER FILE/PROJECT (CSR)		0	3
OPERATIONS	OIL . BILLS OF LADING (CSR)		0	6
OPERATIONS	OIL . DISPATCH SCHEDULES (CSR)		0	15
OPERATIONS	OIL . TANKERMAN LOG SHEETS (CSR)		0	15
OPERATIONS	OVP . ACQUISITION		0	15
OPERATIONS	OVP . BUDGET ACCOMPLISHMENT CRITICAL ISSUES		0	1
OPERATIONS	OVP . BUILDING RECORDS-VESSELS		0	6
OPERATIONS	OVP . CONTINGENCY PLANS		0	1
OPERATIONS	OVP . CONTRACT, TOWAGE		0	6
OPERATIONS	OVP . DECK OFFICERS' MEETING		0	2
OPERATIONS	OVP . DIVESTMENT		0	6
OPERATIONS	OVP . ENHANCED TRACTOR TUG MATERIAL		0	15
OPERATIONS	OVP . LABOR NEGOTIATIONS		0	6
OPERATIONS	OVP . MAINTENANCE & REPAIR RECORDS		0	15
OPERATIONS	OVP . OIL SPILL RECORDS		0	10
OPERATIONS	OVP . PROJECTS		0	1
OPERATIONS	OVP . PUBLIC HEARINGS/PROPOSED RULE MEETING		0	1
OPERATIONS	OVP . SECURITY POLICY & PROCEDURES		0	10
OPERATIONS	OVP . SPECIAL SUBJECT MATTER		0	2
OPERATIONS	OVP . TASK FORCE RECORDS		0	1
OPERATIONS	OVP . TOWING SAFETY ADVISORY COMMISSION		0	10
OPERATIONS	OVP . TRC BOARD MEETING PLAN PRESENTATION		0	1
OPERATIONS	OVP . UNIT EVALUATION		0	7
OPERATIONS	OVP . VESSEL VALUES		0	6

DEPARTMENT	RECORDS CATEGORY NAME	REVIEW YEARS:	ACTIVE	INACT
OPERATIONS	OVP . VESSELS SOLD		0	6
OPERATIONS	OVP . VISITOR REGISTRATION		0	1
OPERATIONS	OVP . WASH. REGIONAL MARINE SAFETY COMM.		0	3
OPERATIONS	PNW . AD AGENCY SELECTION		0	3
OPERATIONS	PNW . CONTRACT, CHARTER BOATS (COPY)		0	6
OPERATIONS	PNW . CONTRACT, CUSTOMER (COPY)		0	6
OPERATIONS	PNW . CONTRACT, PRIVATE CARRIAGE (COPY)		0	6
OPERATIONS	PNW . CONTRACT, RAILCAR (COPY)		0	6
OPERATIONS	PNW . CONTRACT, TOWAGE (COPY)		0	6
OPERATIONS	PNW . MARKETSHARE (COMPETITOR INFORMATION)		0	3
OPERATIONS	PNW . ORDER FILES		0	3
OPERATIONS	PNW . RATES		0	2
OPERATIONS	PNW . SALES RECORDS-VESSELS, SALES, PROJECTS		0	3
OPERATIONS	PNW . WEEKLY ACTIVITY REPORT		0	1
OPERATIONS	VAD . VESSEL ARCHIVES		0	10
OPERATIONS	VAD . VESSEL FILES (OFFICIAL DOCUMENTS)		0	10
OPERATIONS	VAD . VESSELS SOLD		0	6
PURCHASING	PUR . BILLS OF LADING		0	6
PURCHASING	PUR . CURRENT VESSEL HISTORY		0	1
PURCHASING	PUR . CYCLE COUNT WORKSHEETS, INVENTORY PHYSICAL		0	3
PURCHASING	PUR . PETTY CASH ORDERS		0	6
PURCHASING	PUR . PURCHASE ORDERS		0	6
PURCHASING	PUR . VENDOR VOLUME OF BUSINESS REPORT		0	6
RISK MGMT	RSK . CLAIMS . ACCIDENT CARDS (CAPTAIN & SEAMEN)		0	5
RISK MGMT	RSK . CLAIMS . ACTIVITY SUMMARY REPORTS		0	3
RISK MGMT	RSK . CLAIMS . CASUALTY LOSS REPORTS		0	3
RISK MGMT	RSK . CLAIMS . CLAIMS LISTING		0	1
RISK MGMT	RSK . CLAIMS . GENERAL LIABILITY		0	15
RISK MGMT	RSK . CLAIMS . HULL & MACHINERY		0	6
RISK MGMT	RSK . CLAIMS . INDUSTRIAL INDEMNITY INFORMATION		0	6
RISK MGMT	RSK . CLAIMS . LONGSHORE		0	15
RISK MGMT	RSK . CLAIMS . MASTER CLAIMS LISTING		0	3
RISK MGMT	RSK . CLAIMS . NON-MARINE, MISC.		0	15
RISK MGMT	RSK . CLAIMS . POLLUTION LIABILITY		0	15
RISK MGMT	RSK . CLAIMS . PROTECTION & INDEMNITY-SEAMEN		0	15
RISK MGMT	RSK . CLAIMS . TOWERS LIABILITY		0	15
RISK MGMT	RSK . CLAIMS . VESSEL CASUALTIES REPORTS		0	6
RISK MGMT	RSK . EC . ENVIRONMENTAL COMPLIANCE DOCUMENTS		0	15
RISK MGMT	RSK . EC . EXPOSURE FIGURES		0	15
RISK MGMT	RSK . EC . HAZARD EXPOSURE RECORDS RISK/SAFETY		0	30
RISK MGMT	RSK . GEN . ACCOUNTING RESERVE REPORT		0	1
RISK MGMT	RSK . GEN . PAYMENT REGISTERS		0	10
RISK MGMT	RSK . GEN . RISK MANAGEMENT DEPARTMENT DESCRIPTIONS		0	6
RISK MGMT	RSK . GEN . WAR RISK RECORDS		0	15
RISK MGMT	RSK . INS . CERTIFICATES OF COMPLIANCE		0	1
RISK MGMT	RSK . INS . CERTIFICATES OF INSURANCE		0	15
RISK MGMT	RSK . INS . LIABILITY RECORDS		0	6
RISK MGMT	RSK . INS . OSHA #200 (RECORDING OF ACCIDENT)		0	15
RISK MGMT	RSK . INS . POLICIES		0	15
RISK MGMT	RSK . INS . RECERTIFICATION		0	6
RISK MGMT	RSK . SAFETY . HEALTH & SAFETY BULLETINS		0	1
RISK MGMT	RSK . SAFETY . SAFETY INSPECTIONS (OPERATIONS/VESSEL ADMINISTRATION)		0	5

DEPARTMENT	RECORDS CATEGORY NAME	REVIEW YEARS:	ACTIVE	INACT
RISK MGMT	RSK . SAFETY . SAFETY RESOURCES		0	5
SALES	OCE . ASSET REDEPLOYMENT		0	1
SALES	OCE . CONTRACTS, LONG TERM		0	6
SALES	OCE . CONTRACTS, SPECULATIVE		0	6
SALES	OCE . SPECIAL PROJECTS		0	3
SHIPYARD	SHP . BLUEPRINTS		0	15
SHIPYARD	SHP . CAPITAL EXPENDITURES (CSR)		0	15
SHIPYARD	SHP . COMMERCIAL FILES-MAINTENANCE & REPAIR		0	15
SHIPYARD	SHP . ENGINE ROOM LOGS (CSR)		0	15
SHIPYARD	SHP . ENGINEERING FILES-ENGINEERING		0	3
SHIPYARD	SHP . ENGINEERING FILES-MACHINERY		0	15
SHIPYARD	SHP . FOSS FILES-CAPITAL APPROPRIATIONS		0	15
SHIPYARD	SHP . FOSS FILES-CASUALTY		0	15
SHIPYARD	SHP . FOSS FILES-MAINTENANCE & REPAIR		0	15
SHIPYARD	SHP . MANPOWER REPORT		0	10
SHIPYARD	SHP . OIL SAMPLINGS (CSR)		0	4
SHIPYARD	SHP . U.S. DEPT. OF TRANSPORTATION-LOAD NOTICE		0	1
TERMINAL	TRM . CONTRACTS (COPY)		0	6
TERMINAL	TRM . CUSTODIAL AGREEMENTS		0	6
TERMINAL	TRM . CUSTODIAL VESSEL FILES (VESSEL BOARDING PERMITS)		0	6
TERMINAL	TRM . JOB CUSTOMER'S FILES		0	6
TERMINAL	TRM . MOORAGE CUSTOMER FILES		0	4
TERMINAL	TRM . STORAGE CUSTOMER FILES		0	3
TERMINAL	TRM . TERMINAL MONTHLY REV/COST FILES		0	6

RECORD DESTRUCTION LIST

November 2, 1976⁷⁷

	WIND RIVER - RAIL Reports	4 years
14a	Contracts	5 year after expiring
15b	Tax records-Property	6 years
7b	Trial Balances	4 years 76
18a	Insurance records Parts	5 → years
19a	Bank Statements	3 years
19b	Cash Receipts	3 years except cash book 77+L
21	Audit reports	3 years
30a	Settlements with Agents &RR's	6 years
40a	Labor Distribution	4 years
44a	Invoice Register	15 years
43b	Cancelled checks-Vouchers	10 years
43c	Vouchers payable #Support	6 years 74 and L
44a	Accounts Receivable Register	15 years
44b	Invoices	4 years 76 and L
44c	Charter agreements	2 years after expiring
50b	Insurance claims	6 years
60a	Tariffs	2 years after expiration
71a	P.O.'s, acknowledgements	3 years
71b	Inventory records	3 years
82	Operating reports-US Engrs.	3 years
83a	Boat Logs ✓	6 years 74+L
83e	Accident reports	3 years
100a	ICC Reports	6 years
101	Annual reports to Stockholders	Permanent
113	Employee records-Applications, etc.	1 year
41a	Payroll Summaries	6 years
41b	Payroll deductions	Optional
42b	Work Orders, Diesel Slips	2 years
41d	Cancelled Payroll Checks	Optional 10 yrs
45a	Deeds & Titles	Permanent
45d	Depreciation Schedules	Permanent
91a	Orders	2 years 78+L
18c	Insurance Policies	Optional
43d	Check Book Stubs	3 years
	CASH RECEIPTS RECORDS	2 YEARS
	TIME SHEETS	7 "

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Old Bob Hindman We are not under ICC Regulations

RECORD RETENTION REQUIREMENTS

The period of retention for each record is affected by requirements of tax laws and other regulatory legislation and by the usefulness of the record. The suggested number of years that the various business records should be kept are listed below:

2 to 3 Years

Acknowledgements

Delivery receipts

3 to 4 Years

Deposit slips

Requisitions

Purchase inquiries

4 to 5 Years

Bank statements

Freight drafts

Bills of lading

Insurance policies

Correspondence with
applicants

(after expiration)

Labor contracts

Employees' application
(after termination)

(after expiration)

Manifests

Express receipts

Receiving reports

Freight bills

Sales invoices

Freight claims

Shipping tickets

(after expiration)

Time cards

5 to 6 Years

Correspondence, general

Inventories

Correspondence, purchase

Orders, original incoming

Credit memos

War contracts and all

Employees' daily time reports

papers pertaining thereto

Employee withholding exemption

certificates (after termination)

6 to 7 Years

Correspondence, war bond

Payroll

Credit files

Price and policy bulletins

Expense reports

(superceded)

Inventory recaps

7 to 8 Years

Checks, payroll

Sales sheets

Employees' earnings record

Specification sheets

Invoice, vendors

Purchase orders

8 to 9 Years

Accident reports (after
settlement)

Checks, general

Agreements, leases

Compensation cases

(after expiration)

(after closing)

Vouchers

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10 Years

Agreements, contracts (after expiration)
Insurance claims (after settlement)

17 Years

Agreements, licenses

Permanent

Agreements, deeds
Ledgers and journals, cash
Numerical copy of voucher
checks
Ledgers and journals,
customer
Ledgers and journals,
general
Annual reports
Plant surveys
Time study reports

Audit reports
Stock certificates
Taxes, State and Federal
Payroll journals
Plant ledgers
Minutes, Stockholders
and Directors
Property papers (including
depreciation schedules)
Patents

Administrative practice with respect to destruction of
records should include-

1. Written authorization by the officer empowered to supervise
with destruction (under a list of records to be destroyed).
2. Signed statement by person designated to actually destroy
records to the effect that such records have been des-
troyed. This should be used as a permanent record of
what has been destroyed and furnishes authority for
such acts.

We feel that the foregoing time schedule for the destruction
of records should be further reviewed by management to determine if
the detailed operations of the business would necessitate any change
in the retention of records.

at subject to the carrier's control, then the record shall include a statement of the relevant circumstances.

1227.6 Carriers going out of business.

The records and documents relating to operations of a carrier subject to the regulations in this part may be destroyed without regard to the prescribed periods of retention after carrier status is abandoned for purposes of the Interstate Commerce Act: *Provided however*, (a) if the carrier is a corporation being dissolved by act of the authority which created it, the records may not be destroyed until dissolution is otherwise complete, and (b) if the carrier is not

incorporated or is being kept alive for purposes other than carrier operations, records relating to former carrier operations may not be destroyed until all transactions relating to such operations are completed.

§ 1227.7 Prescribed periods of retention.

The following list describes the purpose for which a record is necessary and the prescribed periods shall be observed even if a record by some other name serves the described purpose. If identical copies of the same document serve more than one such described purpose, only one copy is required to be retained by the regulations of this part.

Item	Description of records, etc.	Period to be retained
GENERAL AND FINANCIAL		
1	Minute books of directors', executive committee's, stockholders', and other meetings.	Permanent.
2	Code and cipher books, file copies of.	Permanent.
3	Capital stock records:	
	(a) Capital stock ledger.	Permanent.
	(b) Capital stock certificates, records of or stubs of.	Permanent.
	NOTE: If the information shown on the stubs is recorded in permanent records, the stubs are required to be retained only for a period of three years.	
	(c) Stock transfer register.	Permanent.
	(d) Memoranda and bills of sale or of transfer of capital stock.	2 years.
	(e) Capital stock subscription notices and requests for allotment.	1 year.
	(f) Canceled capital stock certificates. (See item 6.)	
4	Long-term debt records:	
	(a) Registers of bonds and certificates.	Permanent.
	(b) Records or stubs of bonds and certificates.	Permanent.
	NOTE: If the information shown on the stubs is recorded in permanent records, the stubs are required to be retained only for a period of three years.	
	(c) Memoranda and bills of sale or of transfer of registered bonds and certificates.	2 years.
	(d) Records of interest coupons paid and unpaid.	3 years after payment.
	(e) Funded debt subscription notices and requests for allotment.	1 year.
	(f) Canceled or unissued bonds, and certificates, and paid interest coupons. (See item 6.)	
5	Corporate elections:	
	(a) Proxies of holders of voting securities.	2 years.
	(b) Lists of holders of voting securities presented at meetings.	6 years.
	(c) Qualification oaths of judges of election.	Optional.
	(d) Qualification oaths of directors.	Optional.
	(e) Ballots cast and tabulations of votes.	2 years.
	(f) Judges' reports of election results.	2 years.
6	Retired stock certificates, bonds, notes, interest coupons, and trustee's certificates, and temporary certificates; taken up and canceled.	Optional.
7	Ledgers:	
	(a) General and auxiliary ledgers and indexes thereto, except as provided for elsewhere in these regulations.	Permanent.
	(b) Trial balance sheets of general and auxiliary ledgers.	4 years.
8	Record of securities owned, in treasury, or with custodians.	Permanent.
9	General and auxiliary journals.	Permanent.
10	General and auxiliary cash books, except cash books at agencies provided for in item 27 (a).	Permanent.
	NOTE: If any receipts or payments are entered in the aggregate in the general cash book and are detailed only on loose sheets, such loose sheets constitute an auxiliary cash book when no other permanent record of the items thereon is made.	
11	(a) General journal entries.	Permanent.
	(b) Supporting papers not otherwise provided for.	6 years.
12	Records summarizing the results of auxiliary (outside) or holding company operations for entry in general books.	6 years.
	NOTE: Ledgers, journals, abstracts, reports, vouchers, tickets, etc., shall be retained for the same periods as are provided for similar documents elsewhere in these regulations.	
13	Corporate identity:	
	(a) Incorporation and other historical records.	Permanent.
	(b) Charters and franchises with supporting details.	Until legally required to release.

Item	Description of records, etc.	Period to be retained
GENERAL AND FINANCIAL—continued		
14	Contracts and agreements:	
	(a) Contracts, leases, and agreements except as provided in item 14(c).	5 years after expiration or cancellation.
	(b) Card or book records of contracts, leases, and agreements made, and expirations and renewals.	Do.
	(c) Contracts and required files for transactions which are subject to the provisions of the Clayton Antitrust Act (15 U.S.C. 20).	In original form for 1 year after expiration or cancellation, provided there is no pending litigation involving these records and, provided that the carrier informs the Commission of its intended action 2 weeks prior to date the records are to be destroyed.
	(d) Card or book records of contracts, leases, and agreements made, and expirations and renewals.	6 years after expiration or cancellation.
15	(a) Tax records, copies of schedules and returns to taxing authorities for tax purposes.	8 years.
	(b) Records of appeals, tax bills, and statements.	6 years after settlement.
16	Copies of applications to and authorities from regulating bodies for the issuance of stocks, bonds, and other securities.	Permanent.
17	Records of expired or canceled fidelity and indemnity bonds, including the bonds.	3 years.
18	Insurance records:	
	(a) Records pertaining to the payment of insurance premiums and to insurance recoveries.	3 years.
	(b) Inspectors' reports of conditions of insured property.	2 years.
	(c) Insurance policies.	Optional.
	(d) Schedules of risks covered by self insurance.	3 years.
	Treasurer's records:	
	(a) Statements from depositaries of funds received, disbursed, and transferred.	3 years.
	(b) Daily or other periodical statements of the receipt and disbursement of funds. (See note under item 10.)	3 years.
	(c) Ledgers, journals, and other records of outstanding vouchers, checks, drafts, etc., issued and not presented.	3 years.
	(d) Bank deposit books, and stubs, ledgers, or records of checks.	Optional.
	(e) Copies of deposit slips.	Optional.
	Miscellaneous records pertaining to agents' accounts:	
	(a) General office records or ledgers of agents' accounts showing debits and credits from various sources.	6 years.
	(b) General office records relating to extension of credit for transportation and other charges.	2 years after discontinuance of credit arrangement.
	(c) Statements of corrections in agents' accounts.	3 years.
	Reports of examinations, audits, and transfers by special accountants, traveling auditors, time inspectors, weight inspectors, etc., and supporting papers.	3 years.
	Records pertaining to verification of treasurer's cash or securities.	2 years.
REVENUES		
	Freight revenue records:	
	(a) Details of settlements with agents and others, and with carriers.	6 years.
	(b) Record of unsettled freight bills, freight bills in suspense, etc.	1 year after disposition.
	(c) Tracers and supporting papers concerning unsettled freight bills.	Until settled.
31	Passenger revenue records:	
	(a) Details of settlements with agents and others, and with other carriers.	6 years.
	(b) Records and reports of passenger associations and bureaus.	3 years.
32	Line service revenue records, other than freight and passenger revenues, detailing settlements with agents and others, and with other carriers.	3 years.
33	Records of revenues from operations other than line service, detailing settlements with agents and others, and with other carriers.	3 years.
34	Cash fare collection journals, ledgers, and records.	2 years.
EXPENDITURES		
40	Labor distributions and summaries:	
	(a) Records showing the detailed distribution of labor expenditures charged to all accounts, including memoranda and memorandum recapitulation sheets, except as otherwise provided in item 45.	4 years.
	(b) Work orders, job tickets, and other papers covering the application of labor, the details of which have been transcribed into other records for retention.	2 years.
41	Payroll records:	
	(a) Payrolls and summaries.	6 years.
	(b) Records and memoranda pertaining to deductions from payrolls.	Optional.
	(c) Receipted pay checks, certificates issued for wages, discharge tickets, time tickets, and other evidences of payments for services rendered by employees, except as otherwise provided in item 45.	3 years.
	(d) Canceled pay checks drawn in favor of "bearer" in payment of wages for which receipt is shown on payrolls or other records retained by carrier.	Optional.

Item	Description of records, etc.	Period to be retained
EXPENDITURES—continued		
42	Material distributions and summaries: (a) Journals, ledgers, or other records and memoranda showing the detailed distribution of expenditures for materials and supplies chargeable to all accounts, including memorandum recapitulation sheets. (b) Work orders, job tickets, and other papers covering the application of labor and of materials and supplies, the details of which have been transcribed into other records for retention.	4 years. 2 years.
43	Vouchers: (a) Register of audited vouchers payable and indexes thereto. (b) Paid drafts, paid checks, and receipts for cash paid out, except as otherwise provided in item 50c. (c) All vouchers or accounts payable and supporting papers. (See item 45). (d) Stubs of bank check books. (e) Lists containing authorities for payments of specific vouchers. (f) Reports of drafts issued by claim agents, terminal and station agents, and others. (g) Record or index of vouchers to be made, with notations of dates of issue.	15 years. 10 years. 6 years. 3 years. 2 years. 1 year. Optional.
44	Bills collectible: (a) Register of bills collectible (or accounts receivable bills) and indexes thereto. (b) Copies of bills issued for collection, and supporting papers which do not accompany the original bills. (c) Copies of detailed receipts for rental of vessels to others under charter, contract, or oral agreement. (d) Periodical statements of unsettled accounts, except trial balance sheets. (e) Record or index of bills to be issued, with notations of dates of issue.	15 years. 4 years. 2 years after expiration of agreement. Optional. Optional.
45	Real property and equipment records: (a) Deeds and other title papers. (b) Records and memoranda of the cost or the inventory value of real property and equipment. (c) Records and memoranda showing in detail all the items pertaining to expenditures for real property and equipment. (d) Records and memoranda pertaining to depreciation, retirements, and replacements of equipment and other property; also historical records of equipment and other property. (e) Receipted pay checks, certificates issued for wages, time tickets, and other evidences of payment for services rendered by employees in connection with real property and equipment. If full information concerning the expenditures and the distribution of the charge is shown on payrolls or other records retained according to item 46c.	Permanent. Permanent. Permanent but only 3 years if transferred to permanent records. Permanent. 2 years.
46	Special authorities for expenditures: (a) Estimates and special authorities for expenditures for maintenance and improvements. (b) Detail records and memoranda pertaining to such estimates, if summarized in records covered by item 46a.	Optional if expenditures are detailed in permanent records. Optional.
CLAIMS		
50	Claim records: (a) Claim registers, card or book indexes, and other records in connection with overcharge, loss and damage, personal injury, fire, and other claims. (b) Records showing the details of authorities issued to agents, carriers, and others for participation in freight claims. (c) All papers substantiating overcharge, loss and damage, personal injury, fire, and other claims, whether such papers are filed separately or attached to vouchers. (See item 43b.) (d) Claim jackets if all information thereon appears in records covered by item 50c.	6 years. 6 years. 3 years after settlement or rejection. Optional.
51	Claim investigation records: (a) Reports and statements regarding personal injuries, when not necessary to support claims or vouchers. (b) Tracers, reports, and other records pertaining to unclaimed, over, short, damaged, and refused freight, when not necessary to support claims or vouchers.	3 years. 1 year.
52	Sales orders incident to disposal of damaged, refused, and unclaimed freight.	3 years.
TRAFFIC		
60	Tariffs and other rate authorities: (a) Tariffs, classifications, division sheets, and related circulars affecting the transportation of persons or property, in the general files of the traffic or other department in which the complete official file is maintained. (b) Tariffs, classifications, division sheets, and related circulars in other departments and at agencies, if copies of the same issues of such tariffs, etc., are preserved in the general files referred to in item 60a. (c) Special or reduced rate orders, and supporting papers, covering the movement of passengers. (d) Requests and receipts from agents and others for tariffs, classifications, division sheets, and related circulars. (e) Copies of concurrences and powers of attorney filed with the Interstate Commerce Commission and with other regulating bodies.	2 years after expiration or cancellation. Optional after expiration or cancellation. 2 years after expiration or cancellation. Optional. 2 years after cancellation.

Item	Description of records, etc.	Period to be retained
TRAFFIC—continued		
60	Tariffs and other rate authorities—Continued (f) Written requests on carrier from persons and companies for quotations of rates and copies of carrier's quotations. (g) Authorities for the transportation of property, free or at reduced rates, and supporting papers. (h) Correspondence and working papers in connection with the making of rates and compilation of tariffs, classifications, division sheets, and related circulars affecting the transportation of persons or property.	Optional. 3 years. 3 years after cancellation of tariff, etc.
61	Diversions of freight: (a) Records pertaining to the diversion or reconsignment of freight. (b) Requests, tracers, and correspondence in connection with diversions or reconsignments.	3 years. 2 years.
62	Ticket records: (a) Copies of orders on printing houses for ticket stock. (b) Record of ticket stock received, issued, and destroyed. (c) Requisitions and receipts for tickets and cash fare receipts furnished agents, pursers, and stewards. (d) Used or canceled passenger-fare tickets, chair tickets, stateroom tickets, meal tickets or checks, prepaid orders, exchange checks, and storage checks; the reports of which, showing their sale or issue, have been audited. (See item 80f.) (e) Unissued or unused tickets if a complete record is kept in accordance with item 62b. (f) Inventories of tickets in hands of agents. (g) Records and reports of tickets redeemed.	2 years. 2 years. 2 years. Optional. Optional. 2 years. 2 years.
PURCHASES AND STORES		
70	Bids, offers, copies of orders and correspondence pertaining to the purchase or sale of material and supplies.	3 years.
71	Material and supplies: GENERAL FUEL LOGS + TICKETS (a) Records of material and supplies on hand and detail papers of inventories. (b) Records and reports of material and supplies received and issued. (c) Requisitions and receipts for material and supplies issued, the totals of which have been transcribed into other records for retention.	3 years. 3 years. 1 year.
TRANSPORTATION		
80	Passes and free tickets: (a) Copies of orders on printing houses for pass stock. (b) Records of pass stock received, distributed, and destroyed. (c) Requests for passes, copies or stubs of requests for passes, and receipts for passes. (d) Records of passes issued. (e) Records of passes received from other carriers. (f) Stubs of trip passes. (g) Pass identification slips. (h) Records of annual or term passes honored. (i) Trip passes and free passenger-fare tickets collected. (j) Void, unused, and unissued passes. (k) Records of free passenger-fare tickets issued. (l) Pursers' and stewards' reports of passes collected or honored. (m) Reports of trip passes issued.	1 year. 1 year. 3 years. 3 years. 3 years. 3 years. 1 year. 1 year. 1 year. 1 year. 3 years. 1 year. 2 years.
81	Pursers' and stewards' reports: (a) Reports of cash collections if transcribed to records covered by item 34. (b) Reports of cash collections if not transcribed to records covered by item 34. (c) Reports of tickets collected or honored and of passengers carried. (d) Reports of passes collected or honored. (See item 80.) (e) Reports of baggage handled. (f) Reports of freight and other traffic handled. (g) Balance sheets and supporting papers.	Optional. 2 years. 2 years. 2 years. 2 years. 2 years. 3 years.
82	Operating department records pertaining to the movement of ships, lighters, and barges.	3 years.
83	Ship records: (a) Ship's log. (b) Ship's articles. (c) Passenger and room list. (d) Correspondence in connection with reservations. (e) Accident reports. (f) Pursers' and stewards' berth and chair checks.	6 years. 6 years. 6 years. 1 year. 3 years. Optional.
AGENCIES		
90	Freight records: (a) Reports of freight forwarded and received. (b) Transfer records of freight received from and delivered to connecting carriers.	3 years. 3 years.
91	Freight waybills and freight bills: (a) Original local waybills and freight bills, and audited copies thereof. (b) Original interline waybills and freight bills received from other carriers. (c) Copies of all interline waybills and freight bills made to other carriers. (d) Copies of interline waybills moving between points on other lines to which the carrier is intermediate.	2 years. 2 years. 2 years. 2 years.

Item	Description of records, etc.	Period to be retained
AGENCIES—continued		
91	Freight waybills and freight bills—Continued (a) Reports of undercharges and overcharges (correction notices)..... (f) Company freight waybills..... (g) Copies of waybills and freight bills furnished to joint traffic associations, bureaus, and similar agencies, if such copies contain no information other than that appearing on the original waybills and freight bills or in other records. (h) Memoranda on slips on which are listed waybills and freight bills sent to the audit office, if such memoranda or slips are not used in auditing the accounts.	2 years. 2 years. Optional. Optional.
92	Bills of lading and releases: (a) Copies of bills of lading..... (b) Shippers' order-notify bills of lading taken up and canceled..... (c) Contracts covering transportation and storage risks of carriers..... (d) Shipping tickets..... (e) Dray tickets.....	2 years. 2 years. 4 years. 2 years. 2 years.
93	Baggage records: (a) Baggage waybills and manifests..... (b) Records of baggage handled..... (c) Used and canceled baggage checks (not excess baggage)..... (d) Excess baggage checks (including c.o.d.), excess baggage book coupons, and excess baggage permits; the reports of which have been audited. (e) Record of baggage check stock received, issued, or destroyed..... (f) Unused baggage checks, if record is kept in accordance with item 93e..... (g) Receipts from agents, pursers, stewards, baggage masters, and others; for valuable letters and packages.	2 years. 2 years. Optional. Optional. 2 years. Optional. Optional.
94	Agents' reports: (a) Reports of ticket sales..... (b) Baggage reports..... (c) Reports of miscellaneous collections.....	2 years. 2 years. 2 years.
95	Remittances: Agents', pursers', and stewards' remittance slips, bank deposit slips, and supporting papers, not provided for elsewhere.	2 years.
96	Agents' balance sheets and supporting papers.	3 years.
97	Other records at stations, wharf offices, pursers' and stewards' offices, and other agencies: (a) Cash books..... (b) All others.....	6 years. 3 years.
98	Instructions to agents and others: (a) Books and circulars of instructions to agents and others in the general file of the department in which the complete official file is maintained. (b) Surplus copies of books and circulars of instructions and copies in other departments and at agencies, if copies of the same issues are preserved in the general file referred to in item 98a.	3 years after expiration or cancellation. Optional.
99	Duplicate copies of reports, records, and documents retained in agency files, the retention of which is not provided for elsewhere.	Optional.
STATISTICS		
100	Reports to Interstate Commerce Commission and other regulating bodies: (a) Annual financial, operating, and statistical reports, file copies of, and supporting records and papers. NOTE: If the figures for the above-mentioned reports are assembled on memorandum sheets, such sheets constitute a part of the supporting papers and should be retained accordingly. (b) Periodical reports of operating revenues, expenses, and income, file copies of, and supporting records and papers. (c) Accident reports, file copies of, and supporting records and papers.....	6 years. 3 years. 3 years. Permanent.
101	Annual reports or statements to stockholders, file copies of.....	3 years.
102	Statistical statements, statistical records, and supporting papers showing tonnage, revenue, and expenses not covered by item 100.	Optional.
103	Reports of tonnage, revenue, and receipts used only for preparing statements of estimated revenues or expenses or the movement of traffic.	1 year.
104	Tabulating cards used in the compilation of statistics and other data, when the results are transcribed to other records covered by these regulations.	3 years.
111	Audit reports of public accountants.	Optional.
112	Duplicate copies of records and documents listed in these regulations, if all information on such duplicates is contained on the originals or other copies retained.	1 year.
113	Records of employees, including applications for employment, reports and certificates of examinations, service records, efficiency tests, employees' rosters, and other similar records.	1 year.
114	Provident department records, such as employees' relief, hospital, insurance, and savings departments, other than records pertaining to the receipt and disbursement of funds. NOTE: The records pertaining to the receipt and disbursement of funds must be retained for the same periods as are provided for similar records in item 10b.	Permanent.
115	Data relating to records destroyed.....	For the period prescribed for the record to which the correspondence relates.
116	Correspondence and records thereof relating to the subjects listed in these regulations, not otherwise provided for.	

- END -

memoranda, documents, papers, or correspondence, and the circumstances under which they were lost or destroyed.

Subpart C—Brokers

§ 1226.30 Brokers.

The requirements of §§ 1226.20 to 1226.22 inclusive, shall apply equally to brokers when the subject matter permits application.

PART 1227—WATER CARRIERS

Sec.

- 1227.0 Regulations prescribed.
- 1227.1 Introduction.
- 1227.2 Authority to destroy records.
- 1227.3 Photographic copies.
- 1227.4 Supervision of destruction.
- 1227.5 Record of destroyed records.
- 1227.6 Carriers going out of business.
- 1227.7 Prescribed periods of retention.

AUTHORITY: The provisions of this Part 1227 issued under secs. 304, 318, 317, 54 Stat. 933, 944, as amended; 49 U.S.C. 304, 318, 317.

SOURCE: The provisions of this Part 1227 appear at 82 F.R. 20446, Dec. 20, 1967, unless otherwise noted.

SPECIAL NOTE: Sections 317 and 318 of the Interstate Commerce Act, as amended, include the following provisions:

Sec. 317(d) Any water carrier or other person, or any officer, agent, employee, or representative thereof, who shall willfully fail or refuse . . . to keep accounts, records, and memoranda in the form and manner prescribed by the Commission, or shall willfully falsify, destroy, mutilate, or alter any report, account, record, memorandum, book, correspondence, or other document, required under this part to be kept, . . . shall be deemed guilty of a misdemeanor, and upon conviction thereof in any court of the United States of competent jurisdiction within the district in which such offense was in whole or in part committed, be subject for each offense to a fine of not more than \$5,000. As used in this subsection, the word "keep" shall be construed to mean made, prepared, or compiled, as well as retained.

Sec. 318(g) The Commission may issue orders specifying such operating, accounting, or financial papers, records, books, blanks, tickets, stubs, correspondence, or documents of water carriers or lessors as may, after a reasonable time, be destroyed, and prescribing the length of time the same shall be preserved.

§ 1227.0 Regulations prescribed.

Effective June 1, 1957, all carriers by water, including lessors, thereof, shall comply with the regulations in this part before destroying any operating, ac-

counting, or financial papers, records, books, blanks, tickets, stubs, correspondence, or documents.

§ 1227.1 Introduction.

The regulations in this part specify the records and documents which may be destroyed and prescribe the length of time the same shall be preserved, but mention of a record or document hereinafter imposes no requirement that it shall be installed if its purpose is otherwise being adequately served. Compliance with the regulations in this part will not exempt a carrier from statutory requirements, other than provisions of the Interstate Commerce Act, for retention of records or documents for periods longer than those prescribed in this part.

§ 1227.2 Authority to destroy records.

(a) *General authority.* Carriers by water may destroy records or documents named or described in the regulations in this part after they have been preserved for the prescribed periods of time. Permanent records are those which may not be destroyed without special authority.

(b) *Special authority.* A carrier proposing to destroy records or documents which are not named or described in the regulations in this part, or which if named or described have not been retained for the period required by the regulations in this part, may request special authority to destroy them. Applications for such special authority shall describe in detail the records or documents to be destroyed and shall explain why their continued retention is unnecessary.

§ 1227.3 Photographic copies.

(a) Certain records and documents may be preserved on microfilm and the film retained in lieu of the original record or document, subject to the following limitations:

(1) The records listed in § 1227.7 with a permanent retention period may not be destroyed after being photographed for preservation unless special authority is first secured as provided in § 1227.2(b).

(2) Records and documents listed in the following items of § 1227.7 shall be retained in their original form throughout the entire period of retention prescribed for them respectively, unless special au-

thority to destroy them is first secured as provided in § 1227.2(b):

Item	Description
5-----	Corporate elections.
8-----	Record of securities owned, in treasury, or with custodians.
15-----	Tax records.
41(a)-----	Payrolls and summaries.
43(a)-----	Register of audited vouchers payable and indexes thereto.
43(b)-----	Paid drafts, paid checks, and receipts for cash paid out.
43(c)-----	Vouchers or accounts payable and supporting papers.
44(a)-----	Register of bills collectible and indexes thereto.
118-----	Correspondence which pertains to records or documents required by this subsection to be retained in original form.

(3) The records and documents listed in this subparagraph, which are required under the regulations in this part to be retained two years or more, shall be retained in their original form at least two years, even after they have been photographed for preservation:

Item	Description
12-----	Records summarizing the results of auxiliary or holding company operations for entry in general books.
20-----	Miscellaneous records pertaining to agents' accounts.
30-----	Freight revenue records.
31-----	Passenger revenue records.
32-----	Line service revenue records, other than freight and passenger revenues, detailing settlements with agents and others, and with other carriers.
33-----	Records of revenues from operations other than line service, detailing settlements with agents and others, and with other carriers.
50-----	Claim records.
51-----	Diversions of freight.
53-----	Ship's records (for Ship's logs, see § 1227.3(a)(1)).
90 to 99----	Agencies.
118-----	Correspondence which pertains to records or documents required by this subsection to be retained two years in original form.

(b) To be acceptable in lieu of original records, photographic copies must meet the following minimum requirements:

(1) Photographic copies shall be no less readily accessible than the original

record or document as normally filed or preserved would be, and suitable means or facilities shall be available to locate, identify, read, or reproduce such photographic copies. Photographic copies shall be preserved until the end of the period prescribed for the original records or documents.

(2) Any significant characteristic, feature, or other attribute of the original record or document, which photography in black and white will not preserve, shall be clearly indicated before the photograph is made.

(3) The reverse side of printed forms need not be copied if nothing has been added to the printed matter common to all such forms, but an identified specimen of such form shall be on the film for reference.

(4) Film used for photographing copies shall be of permanent record type meeting in all respects the minimum specifications of the National Bureau of Standards, and all processes recommended by the manufacturer shall be observed to protect it from deterioration or accidental destruction.

§ 1227.4 Supervision of destruction.

Within six months after the effective date of the regulations in this part, or within six months after becoming subject to this provision, each carrier shall appoint an officer or other responsible employee to supervise the destruction of records and documents. Such appointment shall be by formal corporate act or, if the carrier is not incorporated, by such formal act as would be necessary to execute a contract binding on the carrier.

§ 1227.5 Record of destroyed records.

The supervising officer or other designated employee shall maintain a record of all carrier records and documents which have been destroyed pursuant to the regulations of this part, except those the retention of which is optional with the carrier. The record shall be available for inspection in the office of the supervising officer and shall be in such detail that the destroyed records or documents may be identified and the time, place, and method of destruction can be established. If the destruction is by accident or at the hand of someone

erations, among them state or local statutes or regulations, regulated-industry requirements, contract or indenture covenants and pending or threatened claims, litigation or investigations may demand longer retention of certain records. Accordingly, the provisions of a particular record-retention plan must be given the utmost management and legal

scrutiny.

Specialized industries and businesses may want to obtain the complete government booklet, which answers many specific questions about particular industries. Write for: Guide to Record Retention Requirements, Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Record Retention Guidelines*

Type of Record	Retention Period (years)	Type of Record	Retention Period (years)
ACCOUNTING		ACCOUNTING (continued)	
Auditors' reports	Permanent	Petty cash vouchers	3
Bank deposit slips	3	Production and sales reports	3
Bank statements	3	Purchase journal	Permanent
Bills of lading	3	Subsidiary ledgers (accounts receivable, accounts payable, etc.)	6
Budgets	2	Timecards and daily time reports	3
Cancelled checks			
General	3	CORPORATE RECORDS	
Payroll	3	Articles of incorporation	Permanent
Taxes (payroll related)	4	Bylaws	Permanent
Taxes (income)	Permanent	Capital stock and bond records	Permanent
Cash disbursements journal	Permanent	Contracts and agreements (government construction, partnership, employment, labor, etc.)	Permanent
Cash projections	2	Copyrights and trademark registration	Permanent
Cash receipts journal	Permanent	Legal correspondence	Permanent
Contracts—purchase and sales	3†	Minutes	Permanent
Credit memos	3	Mortgages and note agreements	6†
Depreciation records	3†	Patents	Permanent
Employee expense reports	3	Personnel files	3†
Employee payroll records (W-2, W-4, annual earnings records, etc.)	4†	INSURANCE	
Financial statements		Accident reports	6
Annual	Permanent	Fire inspection reports	6
Interim	3	Group disability records	6
Freight bills	3	Insurance policies	6†
General journal	Permanent	Safety records	6
General ledger	Permanent	Settled insurance claims	3†
Internal work orders	3	TAXES	
Inventory lists	3	Tax returns and cancelled checks (federal, state and local)	Permanent
Invoices		Sales and use tax returns	Permanent
Sales and cash register tapes	3	Payroll tax returns	4
Purchases (merchandise)	3	Pension/profit-sharing informational returns	Permanent
Purchases (permanent assets)	3†		
Payroll journal	4		
Pension/profit sharing			
Plan and trust agreement	Permanent		
Financial statements	Permanent		
Actuarial reports	Permanent		
IRS approval letter	Permanent		
Associated ledgers and journals	Permanent		

*Unless otherwise noted, all retention periods begin with filing the tax return to which the document applies. If the statute of limitations concerning a tax year is extended, retention should be extended accordingly.

†Retention periods begin after termination, expiration, disposal, etc.